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Wallengrenia otho and *W. egeremet* in Eastern North America (Lepidoptera: Hesperiidae: Hesperiinae)

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JOHN M. BURNS

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Wallengrenia otho and *W. egeremet* in Eastern North America (Lepidoptera: Hesperiidae: Hesperiinae)

John M. Burns

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ABSTRACT

Burns, John M. *Wallengrenia otho* and *W. egeremet* in Eastern North America (Lepidoptera: Hesperiidae: Hesperiinae). *Smithsonian Contributions to Zoology*, number 423, 39 pages, 66 figures, 4 tables, 1985.—Although *Wallengrenia otho* (Smith) and *W. egeremet* (Scudder) were described as different species (in 1797 and 1863), once *egeremet* was listed as a variety of *otho* (in 1877), it tended to stay that way. By mid-twentieth century (what with a little evolution in terminology and concepts), *egeremet* was generally called a subspecies of *otho*, which meant (by definition) that the two must be allopatric. Because geographic overlap was apparent, American workers variously (1) invoked a considerable blend zone between the subspecies, (2) pronounced subspecies *egeremet* a form of *otho* in their area of sympatry, or (3) suffered sympatric subspecies. The English skipperman Evans (in 1955) deferred to American subspecific usage but noted that *egeremet* might better be viewed as a species. This view, which is correct, gradually prevailed.

Supporting evidence accumulated over the past two decades from about 2500 specimens is here marshalled and critically analyzed. The genitalia of *W. otho* and *W. egeremet* differ strongly, in males, in the distal ends of the aedeagus and valvae and, in females, in the ductus bursae. Superficially, *otho* is more warmly colored but harder looking and more sharply patterned, whereas *egeremet* is colder but softer and somewhat blurred. Common in the Gulf States (including the Florida Keys), *otho* ranges westward to about 99° and northward to (rarely) the Baltimore-Washington area and the vicinity of Chicago; more common to the north, *egeremet* ranges from the Gulf States (excluding southern Florida) to southern Canada and westward to about 96°–97°. Though *otho* is everywhere multivoltine, *egeremet* is univoltine over much of its range; but both species are bivoltine and essentially synchronic in their main area of sympatry. Winglength reliably reflects adult size; after allowing for sexual dimorphism (females average larger than males) and geographic variation, it is clear that *egeremet* is a significantly larger species than *otho* in eastern North America. Due to prolonged and widespread confusion of *otho* and *egeremet*, detailed lists of specimens examined are provided.

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Wallengrenia otho and *W. egeremet* in Eastern North America (Lepidoptera: Hesperiidae: Hesperiinae)

John M. Burns

Introduction

Although speciation grabbed me as long ago as 1953, I have yet to witness the process from beginning to end (much less experiment with it). My systematic research tends to zero in on pairs of closely related and confused differentiates of uncertain rank (belonging to groups that are already fairly well worked) in the hope that finer analysis will shed a little evolutionary light (e.g., Burns, 1984). Sometimes the chosen two turn out to be too far beyond their divergence to convey anything of interest about how it occurred. The present study is one such disappointment.

Fashion colors our perception. The two *Wallengrenias* in eastern North America were originally described as separate species—*Papilio otho* Smith (1797) from Georgia and *Hesperia egeremet* Scudder (1863) from Massachusetts—and were so treated in ensuing compilations (Weidemeyer, 1864:539–541; Kirby, 1871:603; Edwards, 1872:46). But *egeremet* was soon listed as a variety of *otho* (by Edwards [1877:52], who assigned *egeremet* to "Atlantic States to Florida; Mississippi Valley, Canada" and *otho* to "Gulf States"); and *egeremet* was generally kept subordinate to *otho* thereafter (e.g., Strecker, 1878:170; Smith, 1891:16; Skinner, 1898:85, 1905:28; Dyar, 1902:52; Barnes and McDunnough, 1917:21; Lindsey, 1921:84; Barnes and Benjamin, 1926:24; Lindsey, Bell, and Williams, 1931:106, 108; Bell, 1938:H-27; McDunnough, 1938:34). (At times, *egeremet* was even sunk altogether.) By the middle of the twentieth century, this groundless but entrenched action was having bizarre repercussions. In *A Field Guide to the Butterflies*, after boiling down substantial color differences and giving ranges as "*W. o. otho* . . . Georgia, Florida, Gulf States, Texas, and southward . . . . *W. o. egeremet* . . . northern Florida and Texas northward [to southern Quebec and Ontario]," Klots (1951:248) flatly invoked "a considerable blend zone between the subspecies." Harris ([1950]:23), in recording *W. otho* and *W. o.* var. *egeremet* from Georgia, remarked that both had been caught in Augusta. In *The Butterflies of Virginia*, Clark and Clark (1951:167), though noting explicitly that both skippers had been taken in the Dismal Swamp, persisted in treating them as subspecies, distinguished by ventral hindwing color, with *otho* extensively distributed in southeastern and southcentral Virginia and *egeremet* "throughout the State." Under the heading *Wallengrenia otho egeremet* (Scudder), in papers on the skippers of Arkansas and Texas, Freeman (1945:62, 1951:41) concluded that

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"this northern subspecies occurs as a form in Arkansas" and that "*egeremet* occurs around the Dallas area as a form of *otho* instead of a subspecies, as both fly together at the same time of the year."

Ironically, an English skipperman notorious for reducing good species to subspecific rank (see, e.g., Burns, 1964; Burns and Kendall, 1969:41) appended the following note to his lumped treatment of the genus *Wallengrenia* (Evans, 1955:335):

> In accordance with U.S.A. practice *egeremet* has been left as a sub-species of [*otho*]. In view of the considerable overlap with [*otho*], it is considered it might be preferable to regard it as a species.

In his verbal keys and visual caricatures, Evans (1955:332–333, pl. 77) clearly indicated a diagnostic genitalic difference between *otho* and *egeremet* at the distal end of the valvae.

The air was slow to clear. Mather and Mather (1958:95–96) skirted the folly of sympatric subspecies by presenting their Mississippi data under a single name, *W. o. otho*, even though they held determined series of both skippers, sometimes from the same county. They also directed attention to published reports of both forms from Virginia, Georgia, and Texas. Forbes (1960:97), responding to Evans (1955), called *egeremet* and *otho* distinct species, characterizing each in some detail (without specifying the amount of sympatry) and redescribing in words and drawings (figs. 147 and 148 on page 83) the genitalic difference Evans had noted. Nevertheless, in the influential *Synonymic List of the Nearctic Rhopalocera* (dos Passos, 1964:9) were these skippers once more yclept *W. o. otho* and *W. o. egeremet*. Kimball (1965:54) listed only *W. otho* in *The Lepidoptera of Florida*, saying that "the species is common and is found state-wide . . . . There is an overlapping of typical *otho* with the form *egeremet* (Scudder), but I have made no attempt to locate that zone." (In a much earlier survey of Floridian Lepidoptera, Grossbeck, 1917:31, and his posthumous editor Watson had recorded both *otho* and variety *egeremet*—twice at the same locality.) Shapiro (1966:57), in *Butterflies of the Delaware Valley*, dealt only with *W. egeremet* but noted that it is "probably specifically distinct from *W. otho*."

Meanwhile, in 1963, I began to investigate the mutual relations of *otho* and *egeremet* for myself. Four years later, with regard to what was then the manuscript of his book on *Butterflies of Georgia*, Harris (1972:69) asked me about the sympatric subspecies of *Wallengrenia:* "when . . . Burns was in Atlanta on August 22, 1967, he stated that he was studying *W. otho* and *W. egeremet*, that he had found them to be distinct species, and that he was preparing his findings for publication. He suggested that this be stated in this book, which will be in press before his article is published." (Truer words than these last were never written.) Cued by Harris (1972), Fales (1974) again used the taxonomic result of my work on *Wallengrenia* and cited it. For whatever reasons, ever since Harris (1972), specialists in general—including MacNeill (1975) and Miller and Brown (1981)—have correctly kept *otho* and *egeremet* apart.

As usual, I am concerned in this paper with biology rather than names. Any who might wish to trace the history of these skippers should be aware that their nomenclature got severely tangled. It was slowly straightened out, only to be resnarled by Evans (1955) who, however, quickly rectified it in separate "Addenda and Corrigenda."

I have examined (1) both the facies and the genitalia (dry, in situ) of the type of *egeremet* (Scudder), which is a male with four labels (Mass./Egeremet/S.H. Scudder Coll./Type. 15827) in the Museum of Comparative Zoology, and (2) the original description of *otho* (Smith, 1797:31), which involves a color figure by Abbot (pl. 16) instead of any type-specimen.

Material and Acknowledgments

In connection with this study I looked at well over two and a half thousand adult specimens, not all of which turned out to be *Wallengrenia* or bore useful data; my list of Material Examined cites 2224. I also looked at 660 genitalia fully

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liberated (in individual one-dram vials) from 343 females and 317 males and checked diagnostic parts of the genitalia in situ in hundreds of other males.

I thank the following institutions and curators for lending material or giving access to material in their care:

AME	Allyn Museum of Entomology, Sarasota, Florida (Lee D. and Jacqueline Y. Miller)
AMNH	American Museum of Natural History, New York (Frederick H. Rindge)
BMNH	British Museum (Natural History), London (Richard I. Vane-Wright and Phillip R. Ackery)
CM	Carnegie Museum, Pittsburgh, Pennsylvania (via Lee D. Miller)
CNC	Canadian National Collection, Ottawa (Eugene Munroe)
IU	Department of Plant Sciences, Indiana University, Bloomington (Susan R. Kephart)
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts
UL	Department of Biology, University of Louisville, Kentucky (Charles V. Covell, Jr.)
UMMZ	University of Michigan Museum of Zoology, Ann Arbor (Thomas E. Moore)
USNM	former United States National Museum collections, now deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C.
WVU	Department of Entomology, West Virginia University, Morgantown (Linda Butler)

I also thank the following private collectors for the same reasons: William A. Andersen, Charles V. Covell, Jr., Richard B. Dominick, John H. Fales, Lucien Harris, Jr., J. Richard Heitzman, Roy O. Kendall, Bryant Mather, John M. Nelson, Eric L. Quinter, Mike A. Rickard, John C. Symmes, and Michael E. Toliver. William W. McGuire, Jack R. Powers, and Robert S. Simmons generously donated material.

Thank you: for spreading some of it, Marc Roth; for dissecting genitalia, Steven I. Cohen (SIC), Cynthia Greer McWhorter, Barbara L. Scott, Rogene G. Gillmor (RG), and Richard G. Robbins; for drawing genitalia, Rogene G. Gillmor; for photographing adults, Victor E. Krantz; for inking histograms and mounting figures, George L. Venable; for measuring wings and calculating statistics, Richard G. Robbins; for recording data from specimens and reading proof, my wife, Sarah N. Burns; for processing these words, Denise Dooley; and for reviewing them, C. Don MacNeill, Wayne N. Mathis, and S.S. Nicolay.

National Science Foundation grant GB-5935 directly supported much of the fieldwork, genitalic dissection, and illustration. Smithsonian Institution Fluid Research Fund 1233F4-74 got me to the British Museum (Natural History).

Genitalia

The genitalia are the best place to start. There are good genitalic differences between *W. otho* and *W. egeremet*, in males, not just in the distal end of the valvae (Evans, 1955) but in the distal end of the aedeagus, as well; and, in females, in the ductus bursae. Though the female differences may be more striking, those of the male are more useful because they are readily exposed in most individuals with a little dry dissecting. Having studied hundreds of genitalia from diverse localities without seeing real intergradation, I am confident that *otho* and *egeremet* do not interbreed. Indeed, these species are distinct enough from one another—and so broadly sympatric—that they are probably not even sisters. (However, I have not compared specimens of *Wallengrenia* from anywhere south of the United States as they are the domain of Jacqueline Y. Miller, who has long been conducting an independent and complementary project.)

Male Genitalia

Each valva terminates distally and ventrally in a prominent spike which, though variable, is always relatively delicate (longer and thinner) in *W. otho* (Figures 1, 3–6) but stubby (shorter and thicker) in *W. egeremet* (Figures 2, 7–10). Owing to its position, the spike is easy to see; and, as Figures 1–10 suggest, the essential difference in form is apparent from various angles (including, of course, lateral as well as medial ones).

Even the aedeagal characters are often acces-

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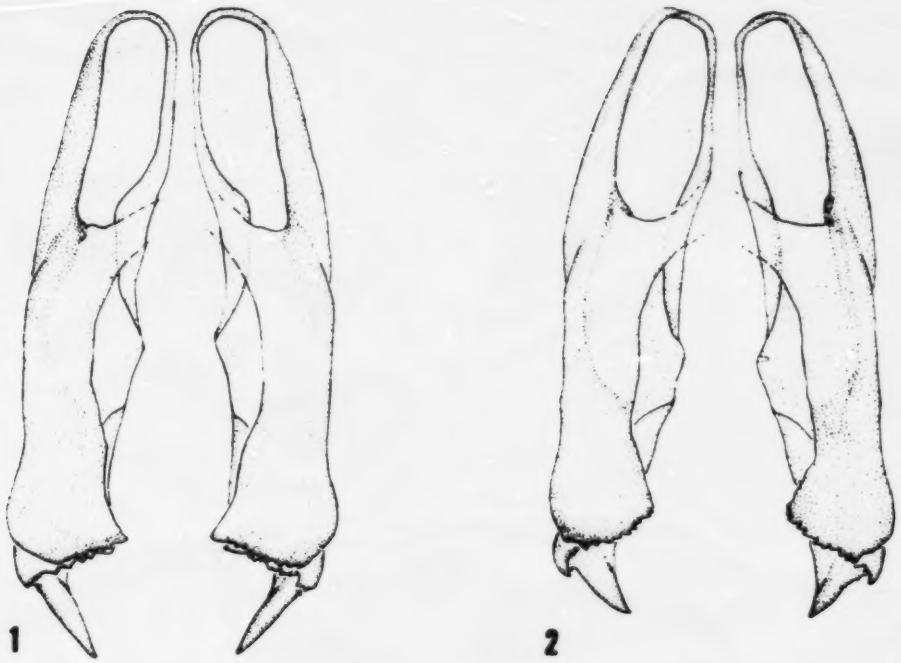

FIGURES 1, 2.—Genitalia of *Wallengrenia* males from Natchez Trace, Madison County, Mississippi, 6 Jun 1954, B. and K. Mather; valvae in dorsal view: 1, *W. otho* (SIC 234); 2, *W. egeremet* (SIC 232).

sible in situ because they, too, are terminal and the end of the aedeagus generally extends back between caudal portions of the valvae. The aedeagus (Figures 11–26) terminates distally and dorsally in a pair of tooth-tipped prongs, one on either side. From each prong depends a two-layered, hollow "flag." The zone of attachment of flag to prong is membranous, as is some of the flag; but laterally and distally the flag becomes sclerotized.

In *otho* (Figures 11–14, 19–22), the right prong is clearly longer—almost always much longer—than the left prong. The flags are broader but less extensively and more lightly sclerotized than they are in *egeremet*. Each flag has a salient, relatively heavily sclerotized, pointed tip and a similar relatively heavily sclerotized tooth more proximally placed; although its placement varies, this tooth is never near the tip. In each flag, the lateral and ventrolateral edge, which bears these two conspicuously sclerotized points, is itself lightly sclerotized.

In *egeremet* (Figures 15–18, 23–26), the two prongs are virtually equal in length (or, infrequently, the right prong slightly to moderately exceeds the left). The flags are narrower than they are in *otho* and are sclerotized along more of their length. The flag attached to the left prong is narrower than the flag attached to the right prong. The tip of the left flag is pointed, and there is a very small tooth (rarely zero or two teeth) on the lateral edge slightly before the tip (very rarely considerably before or at the tip). The flag attached to the right prong is broader. The tip of this flag is also pointed, and there is a lateral tooth (occasionally zero, two, or three teeth) before the tip; but (with rare exceptions) this tooth is more proximal and more robust than its counterpart on the left flag.

Given the complexity of these interspecific aedeagal differences (particularly in the flags), it is remarkable how constant they are.

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The genitalia of eastern North American examples of *Wallengrenia* have been illustrated (under various names and in varying detail) several times before: *otho* by Skinner and Williams (1924:155, fig. 17, reprinted in Lindsey, Bell, and Williams, 1931:101, pl. 24: fig. 17)—uncus, gnathos, tegumen, vinculum, and saccus in ventral view, right valva in medial view, and aedeagus in left lateral view; Evans (1955, pl. 77: fig. M.14.1.[b])—uncus, gnathos, and distal end of aedeagus in ventral and left lateral views, and left valva in medial view; and Forbes (1960:83, fig. 147)—right valva, plus distal ends of two more right valvae, in medial view; and *egeremet* by Scudder (1889, pl. 37: fig. 15)—right valva, uncus, gnathos, tegumen, and dorsal vinculum in lateral view; Eaton (1932:27, pl. 1: fig. 9)—right valva in medial view and uncus, gnathos, tegumen, vinculum, saccus, and aedeagus in left lateral view; Evans (1955, pl. 77: fig. M.14.1.[a])—uncus, gnathos, and distal end of aedeagus in ventral and left lateral views, and left valva in medial view; Forbes (1960:83, fig. 148)—distal ends of three right valvae in medial view; and Duffy and Garland (1978:131, fig. 13, and page 137, fig. 48)—right valva in medial view and aedeagus in dorsal view. In every valval figure, the state of the character involving the distal spike is unequivocal. Again, although two of the three figures showing the entire aedeagus are crude (Skinner and Williams, 1924, of *otho;* Eaton, 1932, of *egeremet*), all three are identifiable at a glance. Even Evans's (1955) far-out diagrams of the distal end of the aedeagus actually capture some of the essence of the sundry interspecific differences—especially in the lateral views—but interpretation is tricky.

Female Genitalia

No one has dealt with the female genitalia. Because the short, broad ductus bursae is heavily sclerotized throughout its length, it contrasts sharply with the large membranous divisions of the genitalia to which it connects fore and aft (Figures 29, 30). The only other genital sclerotization—a pair of plates in the lamella postvaginalis (Figures 29, 30)—is considerably lighter than the ductus bursae. The delicate ductus seminalis (not shown in any figures) joins the posterior end of the corpus bursae, dorsal to the ductus bursae.

As a rule, the ductus bursae of *W. otho* (Figures 27–29, 33–35) is marked, dorsally, just cephalad of the ostium bursae, by what gives an impression of heavier sclerotization on either side, constricting the ductus bursae in the direction of the ostium, and, ventrally, by several low, narrow transverse ridges that sometimes span the full width of the ductus but usually do not. On the other hand, the ductus bursae of *W. egeremet* (Figures 30–32, 36–38) is typically marked by a wide middorsal, longitudinal groove which is usually deep and conspicuously outlined.

The ductal difference is not always so simple. I have looked at enough dissected female genitalia ($N = 343$) to see plenty of variations on these two essentially disparate themes—even, at times, to find one varying in the direction of the other to a startling (though not utterly confusing) degree. For example, *egeremet* occasionally expresses some of the ventral transverse ridges of *otho*, and *otho* very rarely fails to develop any ridges at all (or, about as rarely, comes up with as many as 10 of them). Or *egeremet* occasionally suppresses its dorsal groove or else, still less frequently, inclines a bit toward the peculiar dorsolateral configuration of *otho* immediately anterior to the ostium bursae. Either species may produce a midventral keel or ridge of varying length (see Figures 33 and, especially, 35 for examples of this in *otho*).

Two subtler differences are worth mentioning: the ductus bursae is more dorsoventrally flattened in *otho* than it is in *egeremet* (cf. Figures 27 and 32) and, on an average, the paired plates in the lamella postvaginalis are smaller in *otho* than they are in *egeremet* (cf. Figures 29 and 30).

Facies

These species are superficially separable, as well. From the most general viewpoint, taking in both sexes and both surfaces, *W. otho* (Figures

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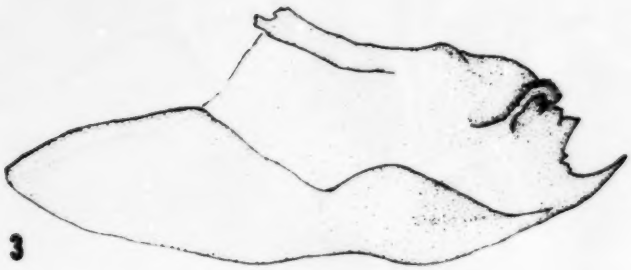

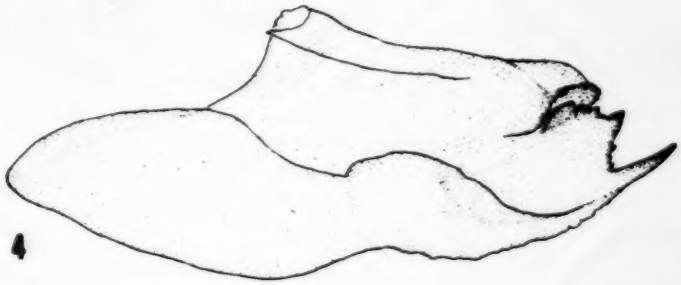

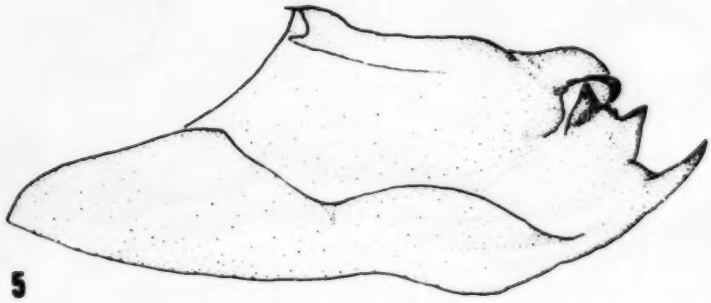

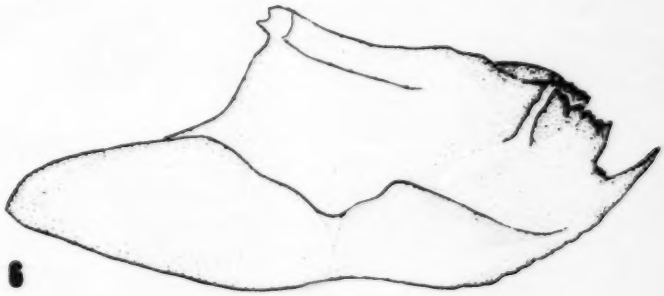

FIGURES 3–6.—Male genitalia of *Wallengrenia otho*; right valva in medial view: 3, Chesapeake Beach, Calvert County, Maryland, 18 Aug 1951, R.S. Simmons (RG 1189) (USNM); 4, Galivants Ferry, Horry County, South Carolina, 22 Aug 1957, J.M. and S.N. Burns (JMB 227) (USNM); 5, Florida City, Dade County, Florida, 15 May 1937 (SIC 137) (AMNH); 6, Natchez Trace, Madison County, Mississippi, 6 Jun 1954, B. and K. Mather (SIC 234).

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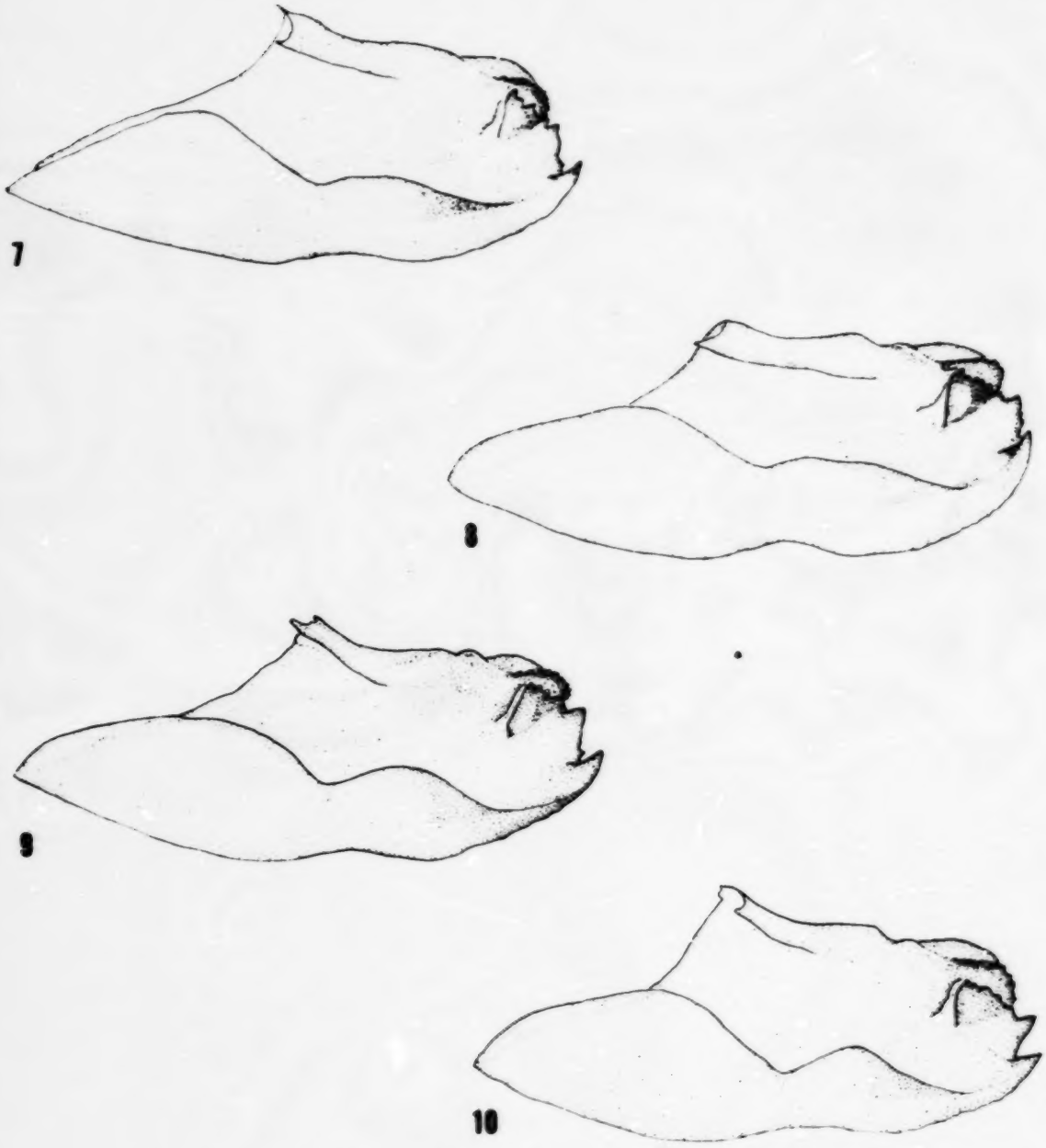

FIGURES 7–10.—Male genitalia of *Wallengrenia egeremet*; right valva in medial view: 7, Dunlop Road, Gatineau Park, Gatineau County, Quebec, 5 Jul 1952, F.H. Rindge (SIC 187) (AMNH); 8, Newark, New Castle County, Delaware, 5 Jul 1962, J.M. Burns (JMB 224) (USNM); 9, near La Plata, Charles County, Maryland, 28 Jul 1960, R.S. Simmons (RG 1190) (USNM); 10, Natchez Trace, Madison County, Mississippi, 6 Jun 1954, B. and K. Mather (SIC 252).

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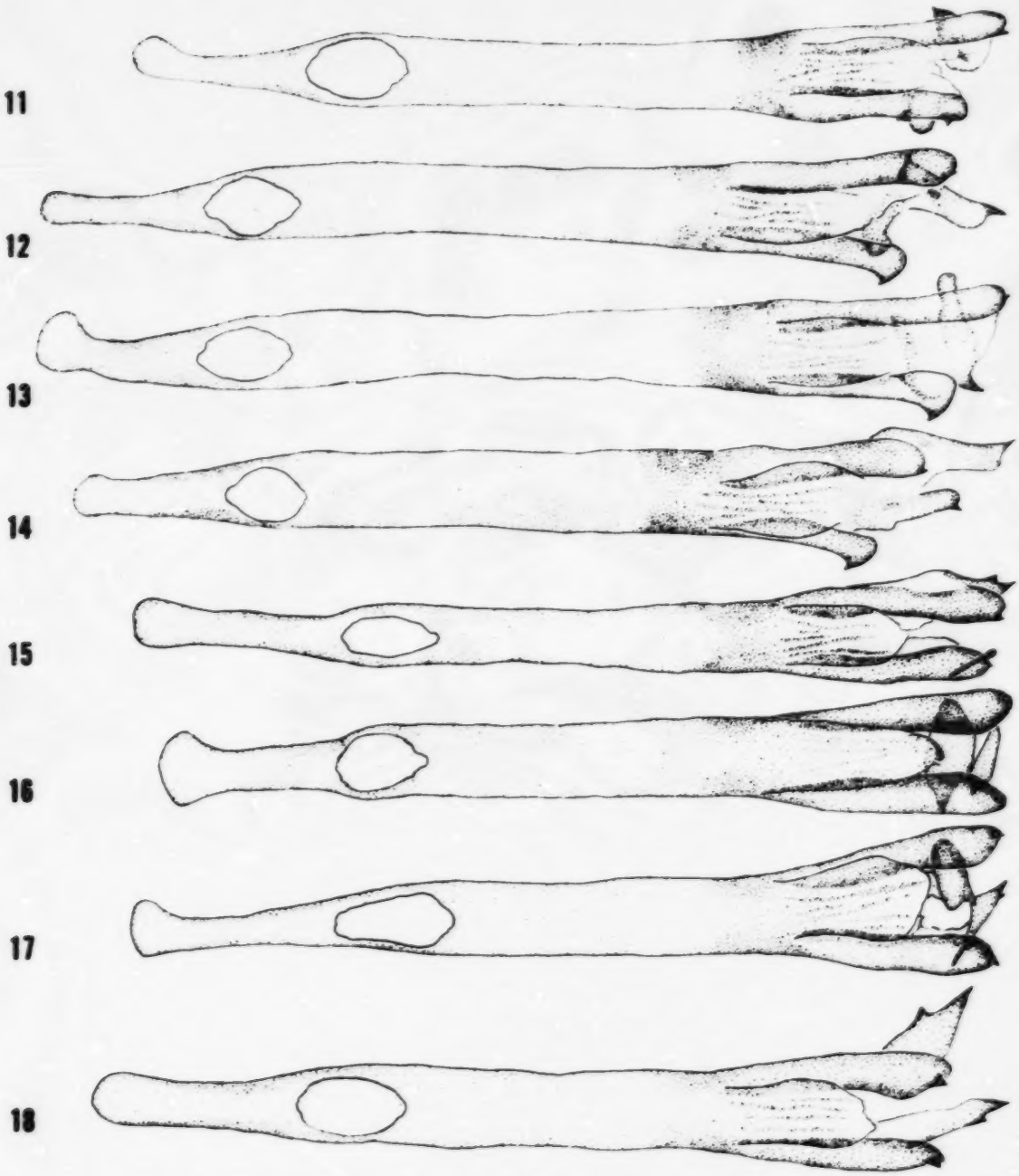

FIGURES 11–18.—Male genitalia of *Wallengrenia;* aedeagus in dorsal view: 11–14, *W. otho;* 11, Maryland; 12, South Carolina; 13, Florida; 14, Mississippi; 15–18, *W. egeremet;* 15, Quebec; 16, Delaware; 17, Maryland; 18, Mississippi (for full specimen data, see Figures 3–10).

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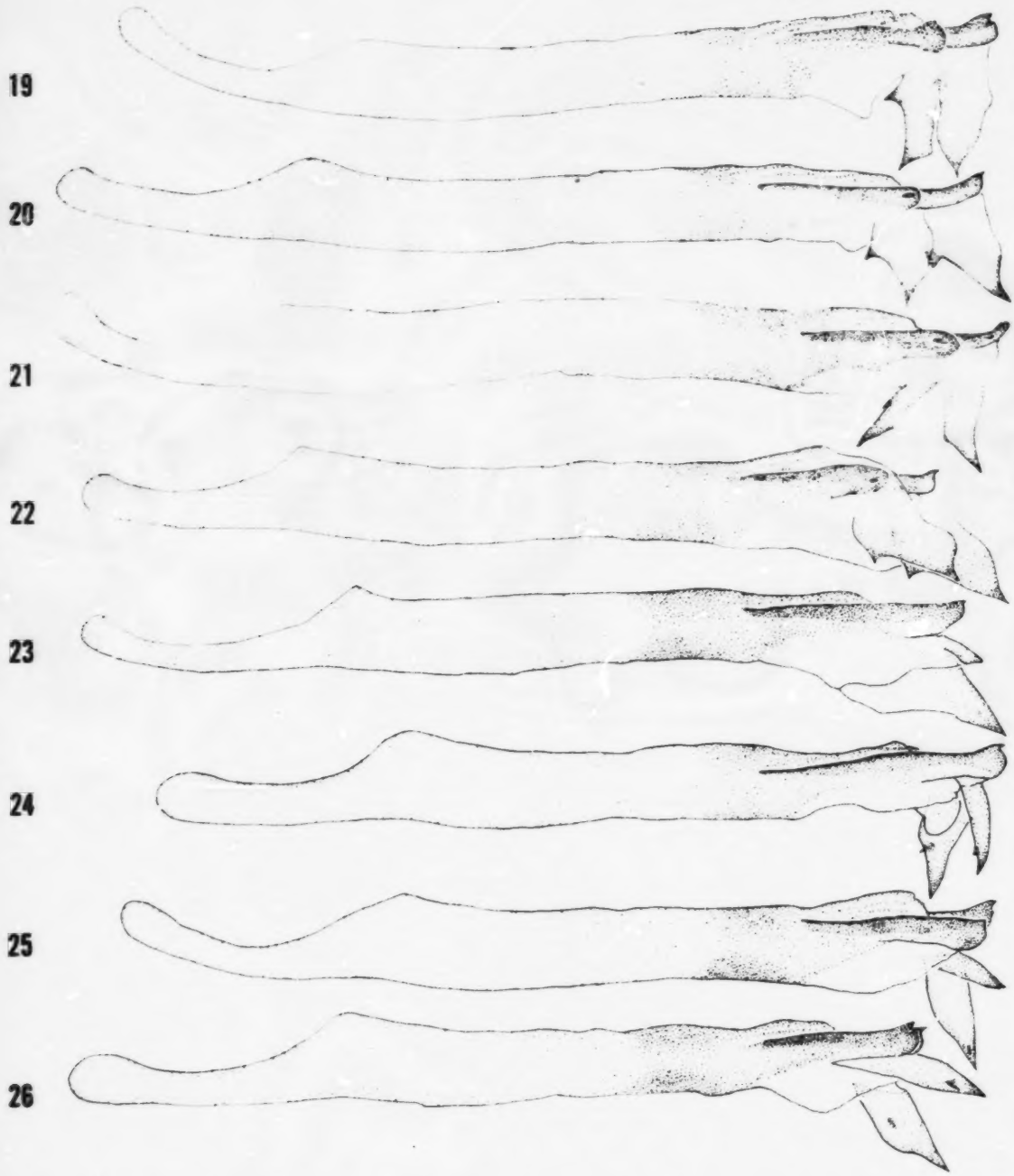

FIGURES 19–26.—Male genitalia of *Wallengrenia;* aedeagus in left lateral view: 19–22, *W. otho;* 23–26. *W. egeremet* (the same aedeagi in the same order as in Figures 11–18).

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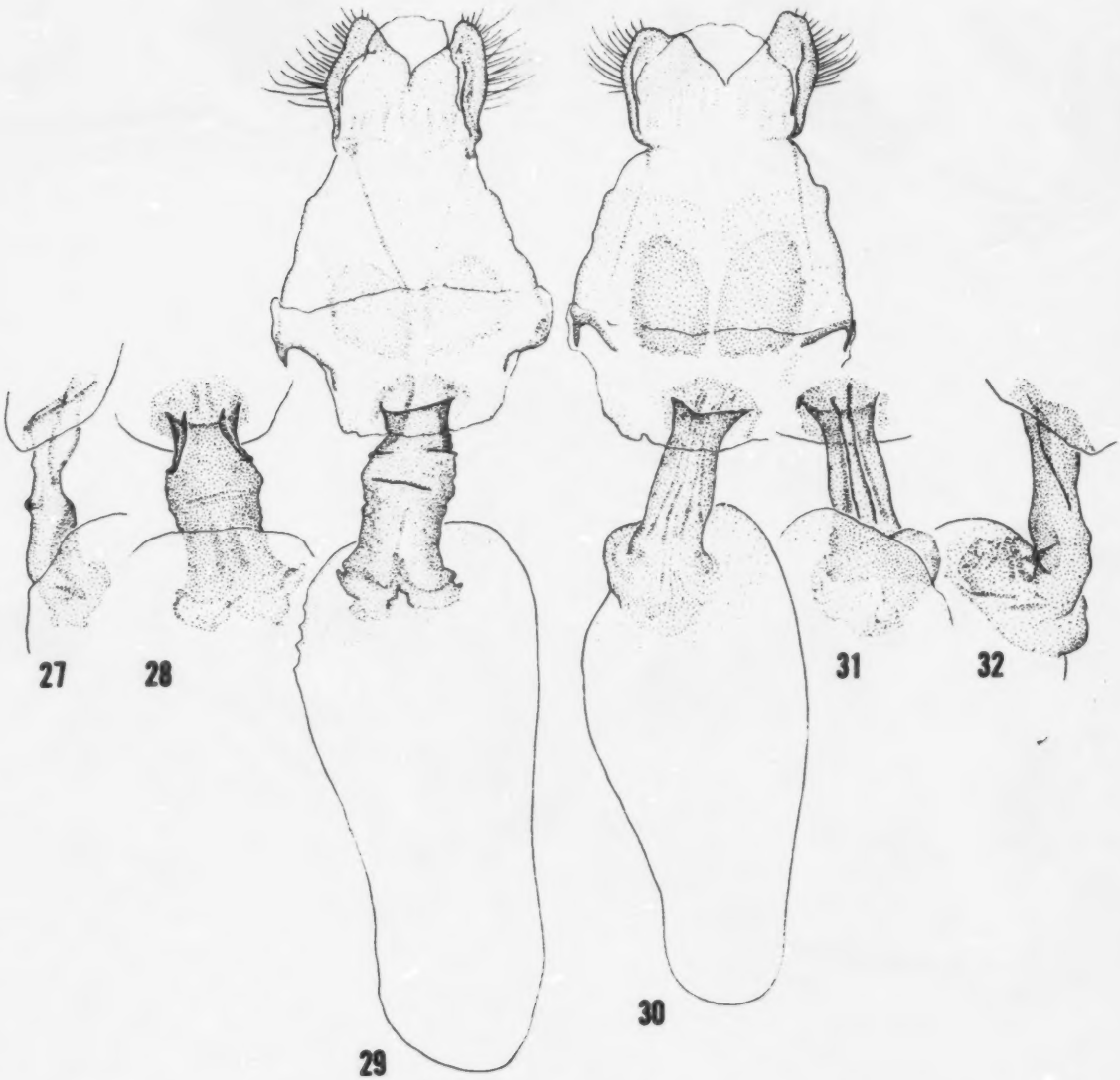

FIGURES 27–32.—Genitalia of two *Wallengrenia* females from Natchez Trace, Madison County, Mississippi, 6 Jun 1954, B. and K. Mather: 27–29, *W. otho* (SIC 375); 30–32, *W. egeremet* (SIC 377); 29, 30, complete female genitalia, plus papillae anales, in ventral view; 28, 31, ductus bursae in dorsal view; 27, ductus bursae in right lateral view; 32, ductus bursae in left lateral view.

39–50) registers as more warmly colored but harder and more sharply patterned, *W. egeremet* (Figures 51–62) as colder in color but softer and somewhat blurred.

Dorsally, both the overscaling and the spots are more orangy in *otho* as opposed to cold yellowish in *egeremet*. Because the spots on the primary are generally paler in females than in males,

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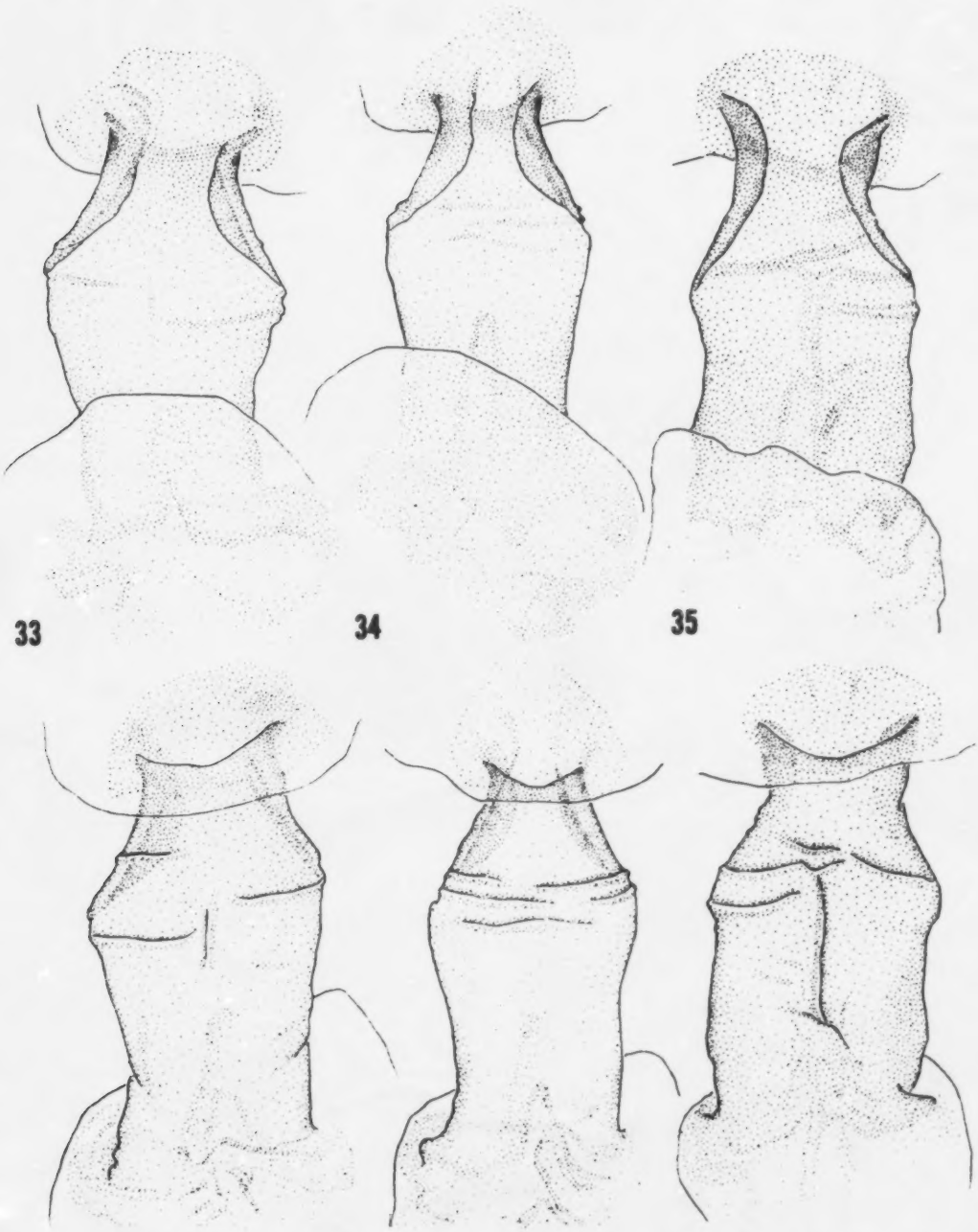

FIGURES 33–35.—Female genitalia of *Wallengrenia otho;* ductus bursae in dorsal (upper) and ventral (lower) views: 33, Florida City, Dade County, Florida, 19 Sep 1936 (SIC 332) (AMNH); 34, Deenwood, Waycross, Ware County, Georgia, 16 to 18 Jul 1916 (SIC 298) (AMNH); 35, Suffolk, formerly Nansemond County, Virginia, 2 Jun 1944, O. Buchholz (SIC 285) (AMNH).

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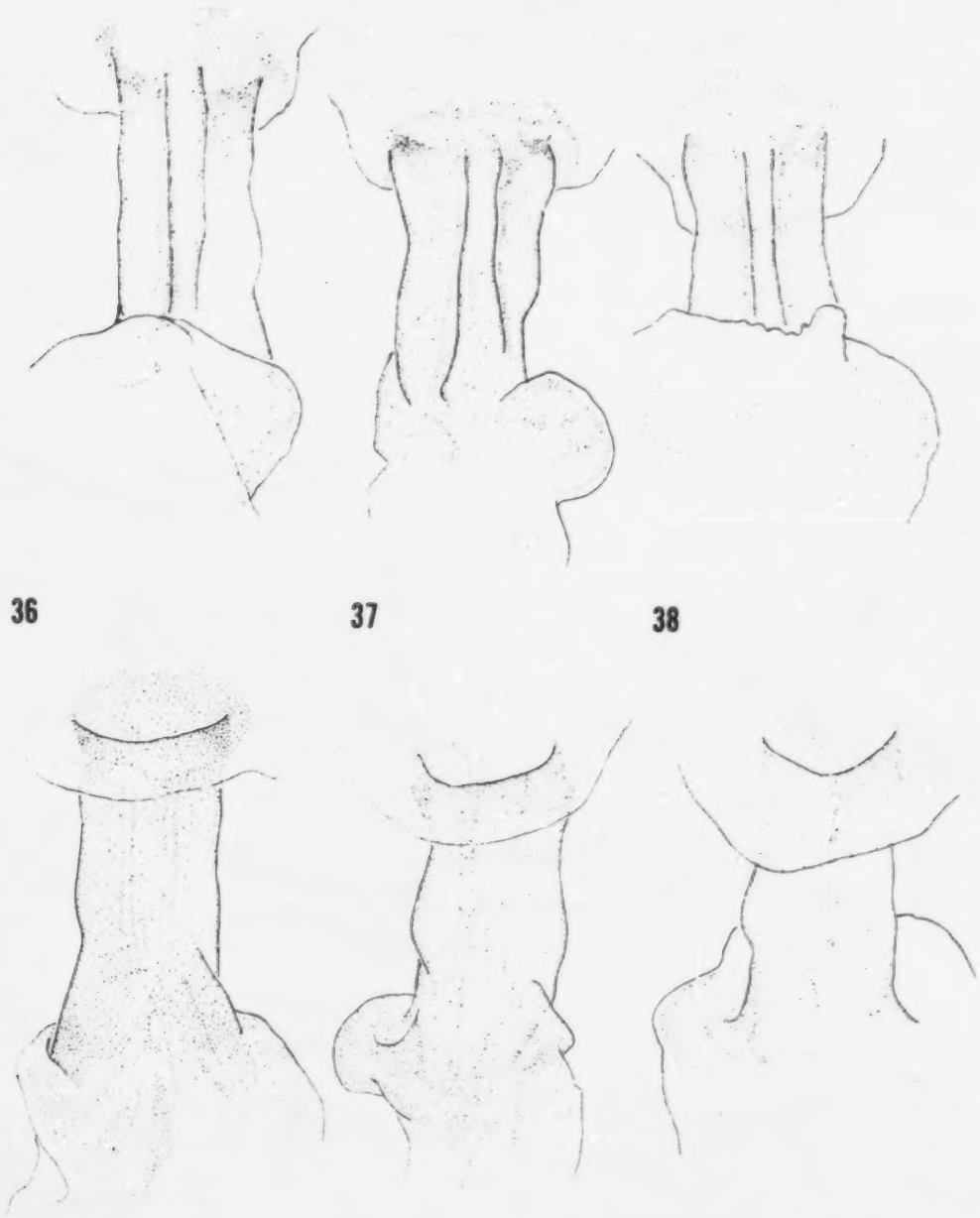

FIGURES 36–38.—Female genitalia of *Wallengrenia egeremet;* ductus bursae in dorsal (upper) and ventral (lower) views: 36, Smithfield, Isle of Wight County, Virginia, 27 Jul 1938, O. Buchholz (SIC 341) (AMNH); 37, 6.4 km N of Washington, Litchfield County, Connecticut, 19 Jul 1962, J.M. Burns (JMB 231) (USNM); 38, Queenston, Lincoln County, Ontario, 11 Jul 1904 (SIC 345) (AMNH).

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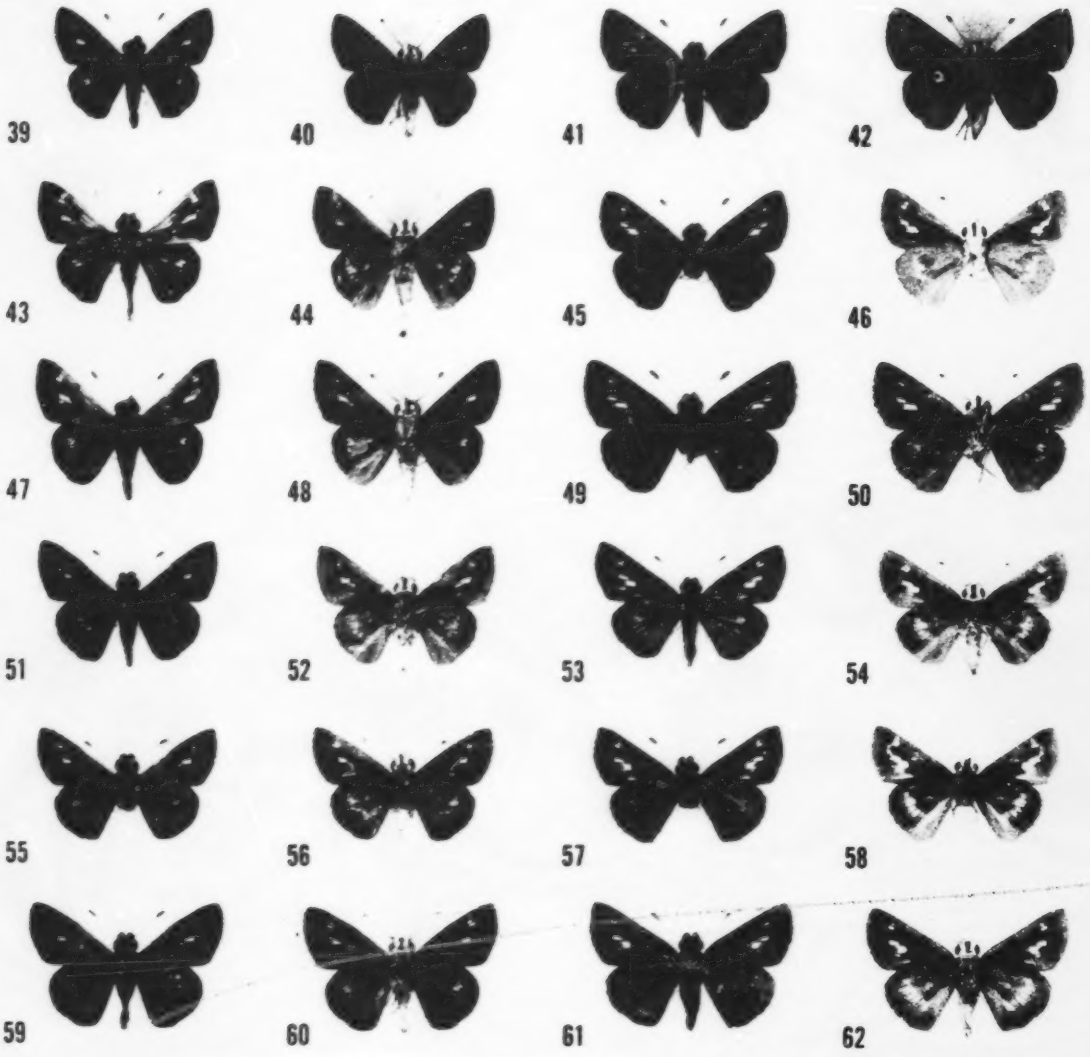

FIGURES 39–62.—Facies of *Wallengrenia;* from left to right, in vertical columns, males (dorsal and ventral) and females (dorsal and ventral). Specimens collected by J.M. or J.M. and S.N. Burns (all USNM): 39–50, *W. otho;* 39–42, Plantersville, Georgetown County, South Carolina, 25 Aug 1974; 43–50, Austin, Travis County, Texas; 43, 44, 27 Apr 1967; 45, 46, 1 May 1967; 47–50, 2 May 1967; 51–62, *W. egeremet;* 51–54, Lexington, Middlesex County, Massachusetts; 51, 52, 2 Jul 1973; 53, 54, 29 Jun 1973; 55, 56, Higby Mountain, 8 km WSW of Middletown, Middlesex County, Connecticut, 10 Jul 1962; 57, 58, 6.4 km N of Washington, Litchfield County, Connecticut, 19 Jul 1962; 59, 60, Sinking Creek Valley, 550 m, 11.3 km E of Pembroke, Giles County, Virginia, 12 Jul 1965; 61, 62, Salt Pond Mountain below Mountain Lake, 915 m, Giles County, Virginia, 13 Jul 1965.

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they often tend far toward white in females of *egeremet*. Typically, the ground color of the ventral secondary is dull reddish orange (i.e., rusty) in *otho* but brown in *egeremet*. The pale spots of the ventral secondary are relatively clear-cut in *otho* but diffuse in *egeremet*, and they tend to "show through" dorsally much more in *otho* than in *egeremet*. These spots are rather less apt to be suppressed in *otho* than they are in *egeremet*. However, the arc that they form is more often irregular in *otho* than it is in *egeremet*.

As usual, variation abounds.

Spatial Distribution

Though both *W. otho* and *W. egeremet* are widespread in eastern North America, *otho* is decidedly more southern. According to Evans (1955), it extends far to the south, in various differentiated forms, through the West Indies and Central and South America to Argentina. According to MacNeill (1975), it goes only as far as Costa Rica and does not inhabit the Caribbean islands. Within the United States, *otho* occurs commonly in the Gulf States, ranging northward (1) in the Piedmont and especially the Atlantic Coastal Plain to the Baltimore-Washington area and (2) in the Mississippi-Ohio Valley to the vicinity of Chicago (Figure 63). It shuns the main mass of the Appalachian Mountains and becomes increasingly scarce toward the north.

By contrast, *egeremet* occurs from the Gulf States to southern Canada and penetrates the Appalachian Mountains (without reaching high elevations); and it is more generally distributed and more common in the northern than in the southern United States (Figure 64). To the south, *egeremet* stops in central peninsular Florida and, with the exception noted below, in eastern Texas (short of the Mexican border), whereas *otho* ranges throughout Florida (including the Keys) and west into central Texas. The western limit of *egeremet* (South Dakota to Texas) varies from about 96° to 97°W longitude (except for four old dateless specimens from Blanco and Burnet counties in central Texas); the western limit of *otho* (Oklahoma and Texas) is about 99°.

Despite major differences in distribution and abundance, *otho* and *egeremet* are sympatric over a large area—shaped something like a fat U—extending from the south end of Lake Michigan southwest to eastern Texas, east to central Florida, and northeast to eastern Maryland. Since *otho* becomes rare to the north, sympatry is most evident in the lower part of the U. These species coexist at the level of the local population and often fly together.

Nothing elicits additional locality records so well as newly published distribution maps. Because mine (Figures 63 and 64) derive strictly from material examined, they are less than complete (but completely reliable as far as they go). Many of the blanks in the maps are trivial: it is clearly not species of *Wallengrenia* but collectors of them that tend to avoid, say, Alabama. More critical are distributional limits which, in spite of some effort, remain inexact. For example, with respect to *egeremet* in the north, I have seen just one specimen from Quebec (Gatineau County) and three from Minnesota (Wabasha County), while this skipper is known to occur (e.g., Macy and Shepard, 1941; Duffy and Garland, 1978) in southern New Brunswick and southern Maine, in and around Montreal, Quebec, and so widely in Minnesota that I suspect it enters extreme eastern North Dakota.

It does not go farther west, however. Lindsey's (1921:84), Lindsey, Bell, and Williams's (1931: 108), and Freeman's (1950) claim of "west to the Rocky Mountains" and Evans's (1955:332) citation of "2 ♂ 1 ♀ Montana" notwithstanding. Evans misinterpreted the opaque abbreviation for Missouri: all three of the so-called "Montana" specimens of *egeremet* in the British Museum (Natural History) are labelled St. Louis, Mo. Both males are *egeremet* all right, but the female is *Pompeius verna* (Edwards). Evans's (1955:332) "Winnipeg" record of *egeremet* is wrong, too: the Manitoba material filed under *egeremet* in BMNH comprises four females of *Euphyes vestris* (Boisduval),

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of which two are labelled "The Pas" and two, "Swan River, 350 mls. N. of Winnipeg."

Except for the female from California (another *E. vestris*), the BMNH specimens on which Evans (1955:333) based the following records of *egeremet* ("3 ♂ 2 ♀ Florida. 2 ♂ 1 ♀ California. 1 ♂ 1 ♀ Texas") are correctly determined; but some are incorrectly labelled. I can dismiss without comment the two males marked simply "Californie." The Texas pair supposedly hails from "Shovel Mt," which I place around the Blanco/Burnet County line. Because two other old specimens (in the USNM collections) labelled Blanco County reinforce this record, I use it in Figure 64, although it lies appreciably to the west of other known Texas localities. Modern confirmation is desirable. One male and two females marked simply "Florida" remind me phenotypically of *egeremet* from that state, but two males labelled "Palm Beach, Fla." do not; and, as this locality is sensibly south of all others, I question it and omit it from Figure 64.

As for Evans's (1955:333) unusual records of *otho* from the United States ("2 ♂ Ohio . . . 3 ♂ 2 ♀ Illinois. 1 ♂ 1 ♀ Alabama . . . 2 ♂ 1 ♀ New York"), the only "supporting" material filed under *otho* in the BMNH actually consists of one male, one female of *otho* labelled simply "Ohio"; one male of *otho* and one male of *egeremet*, each labelled simply "Illinois"; one male of *otho* labelled "Chickasaw, Mobile County, Alabama, U.S.A." and one female of *Polites themistocles* (Latreille) labelled "Mobile, Alabama, U.S.A."; and one female of *egeremet* labelled simply "New York, U.S.A." In perusing the BMNH holdings of *otho* and *egeremet* (as well as of various other skippers), I often found that Evans's published counts of sexed specimens from different geographic areas are off.

Evans did not have an eye for *Wallengrenia* females. Besides those specifically cited above in connection with geographically questionable records, I noted the following misdetermined females (generally with geographically acceptable data) among *otho:* one *Polites themistocles* and one *Euphyes conspicua* (Edwards); and among *egeremet:* eight *P. origenes* (Fabricius), four *Pompeius verna*, and three *E. vestris*. All told, 21 out of 55 supposed females of "*egeremet*" in BMNH were misidentified, and four out of 29 females of "*otho.*" The males were in good order.

Temporal Distribution

In eastern North America, *W. otho* is multivoltine throughout its (essentially southern) range—at least trivoltine in peninsular Florida and the Keys and bivoltine to the north (Figure 65). The more northern species, *W. egeremet*, is univoltine at higher latitudes (and altitudes) and becomes bivoltine at lower ones (Figure 66).

Because univoltine *egeremet* so neatly fits the gap between the two generations of bivoltine *otho*, cursory comparison of Figures 65 and 66 might suggest temporal displacement between closely related species. Nothing could be further from the truth. The staggered pattern comes from comparing allopatric populations. Where *otho* and *egeremet* are regularly sympatric (see the histograms for the region from South Carolina through the Gulf States in Figures 65 and 66), they fly at similar times. For the most part, their two flight periods are May/June and August/September. Tendencies to shift toward April and spill over into October are most pronounced in *otho* from eastern Texas. The flight period in univoltine populations of *egeremet* embraces July.

Various fragmentary data seem to indicate that *egeremet* starts developing a second generation where it approaches the main range of *otho*, or, in other words, that *egeremet* tends to respond like *otho* under similar conditions (until, of course, it reaches some limiting level farther south). The histograms in Figure 66 that include (1) Maryland and Virginia and (2) North Carolina and Tennessee are noticeably broader than the unimodal histograms above them, probably owing to incipient bivoltinism in the skipper as well as to great topographic diversity in the sample areas.

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FIGURE 63.—Geographic distribution of *Wallengrenia otho* in North America north of Mexico (based on material examined). Additional information in text.

Size

METHODS AND CAUTIONS

As a rule, the wings of Lepidoptera reliably reflect adult size. Once expanded and hardened, they hold their dimensions (save for wear and tear), whereas the body, with its flexible and telescoping abdominal segments, does not. To assess size variation, the right primary of spread specimens was measured from base of costa to apex (including fringe) with a vernier caliper calibrated to tenths of a millimeter. All measuring was done by one person, and each specimen was measured on two different days. Repeated measurements were often the same; when they differed, it was usually by just 0.1 mm or 0.2

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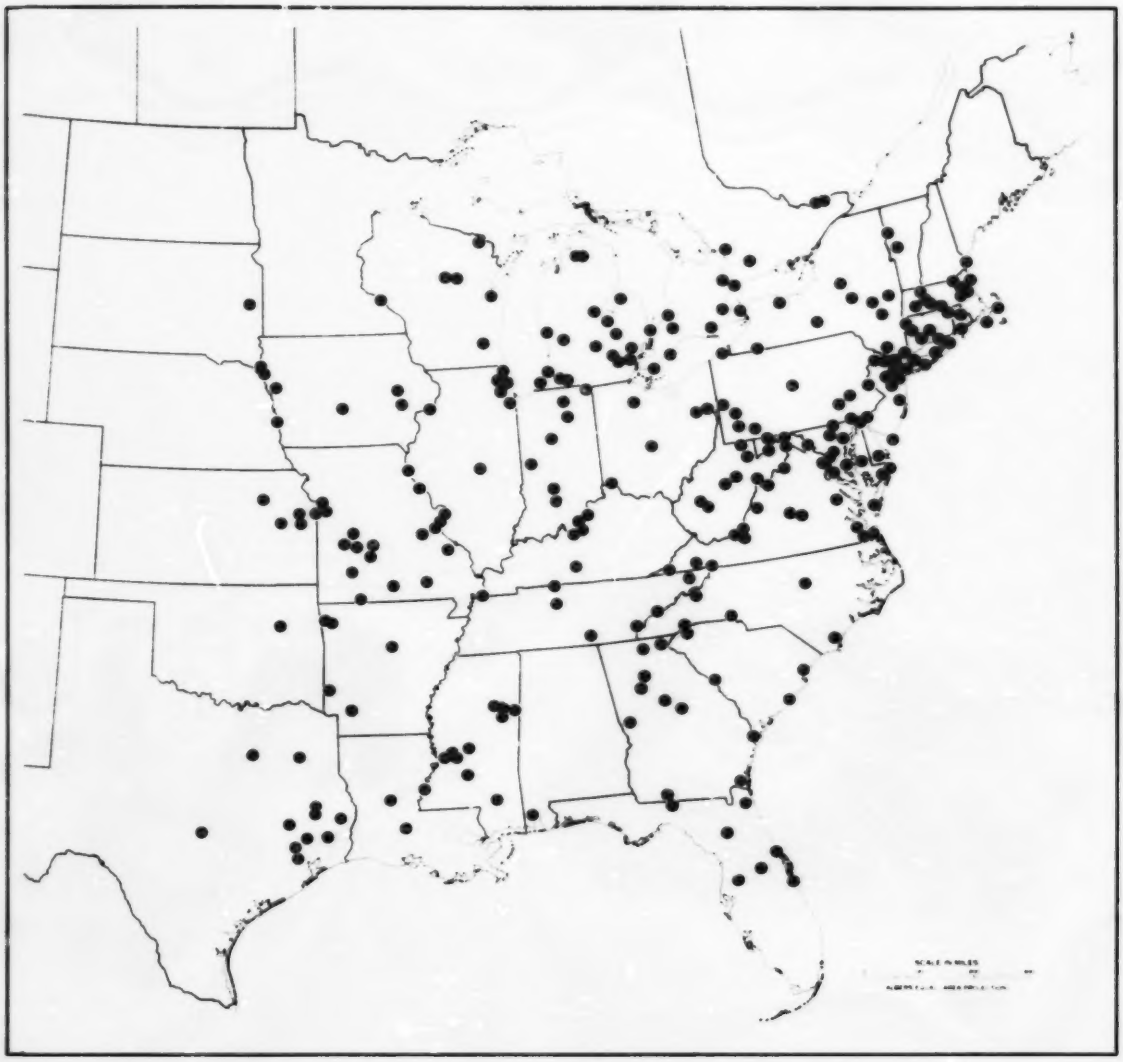

FIGURE 64.—Total geographic distribution of *Wallengrenia egeremet* (based on material examined). Additional information in text.

mm. (To be exact, 41.8% of first and second measurements agreed; 41.4% differed by 0.1 mm; 15.5%, by 0.2 mm; 1.2%, by 0.3 mm; and 0.1%, by 0.4 mm.) Nonidentical measurements were averaged before calculation of sample means and related statistics.

Samples were defined by species, sex, and geographic source—and, at first, in the multivoltine *W. otho*, by time of flight. After temporal distribution had been worked out, individuals of generation one were segregated from those of generation two (or two plus three) in an effort to extract some of the nongenetic components of size. Similar analysis of size variation in multivoltine species of the pyrgine genus *Erynnis* revealed a significant increase in the average winglength

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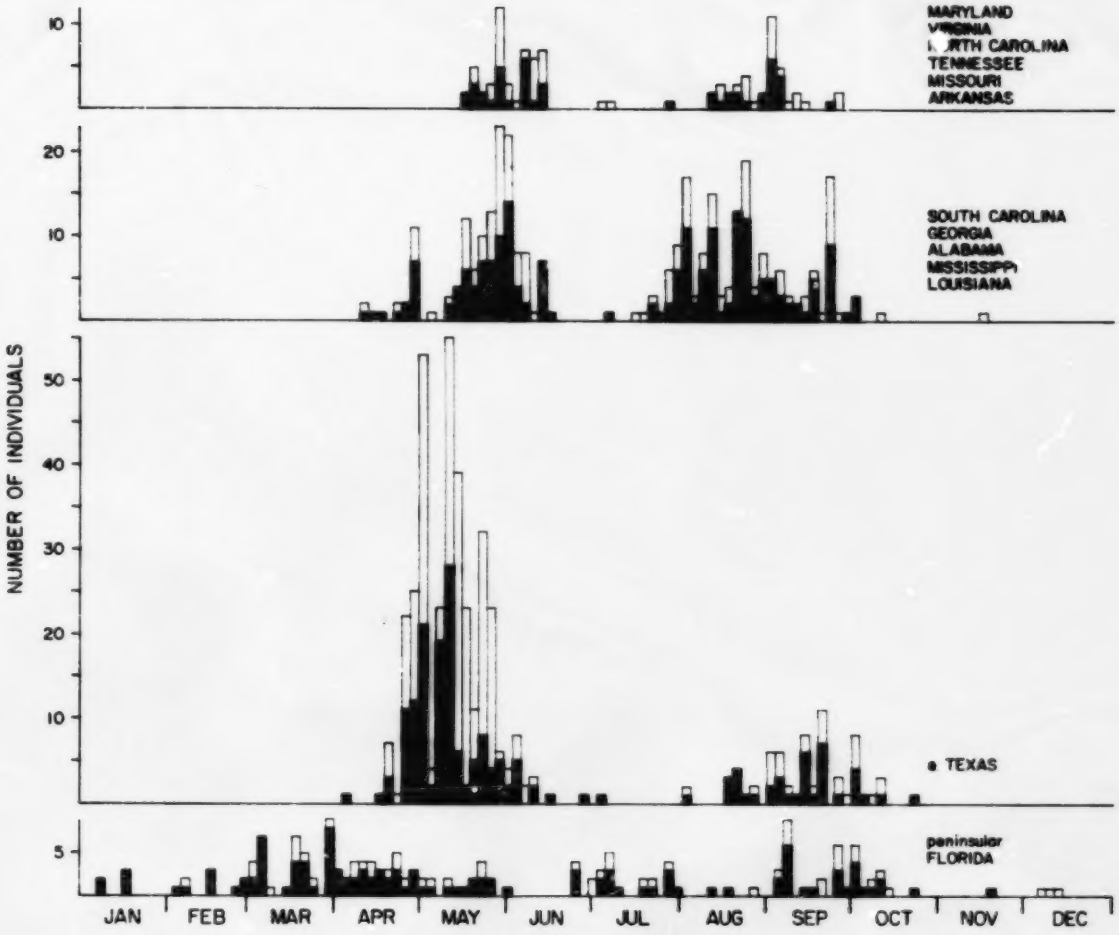

FIGURE 65.—Temporal distribution of wild-caught adults of *Wallengrenia otho* in North America north of Mexico (based on material examined). Temporal class interval three days. Males black, females (stacked on males) white.

of individuals between first and later generations (Burns, 1964). Be that as it may, *otho* showed nothing but an inconsistent tendency toward slightly smaller average winglength in generation two (or two plus three). When the significance of the difference between first and subsequent generation sample means was tested using Student's *t*, *P* varied from a low between .10 and .20 to a high of more than .90 and was usually between .40 and .50 (except for the male and female samples from east Texas, in which *P* was less than .001 and between .001 and .01). Accordingly, data were pooled with respect to time (and calculations were done over).

The areas defining samples are unequal. Both species of *Wallengrenia* in eastern North America have reasonably continuous spatial distributions that can be divided somewhat arbitrarily. Areas were selected to yield samples of comparable size, at least with respect to males (the commoner sex in collections). For convenience, state boundaries were followed, but with an eye to ecologic as well

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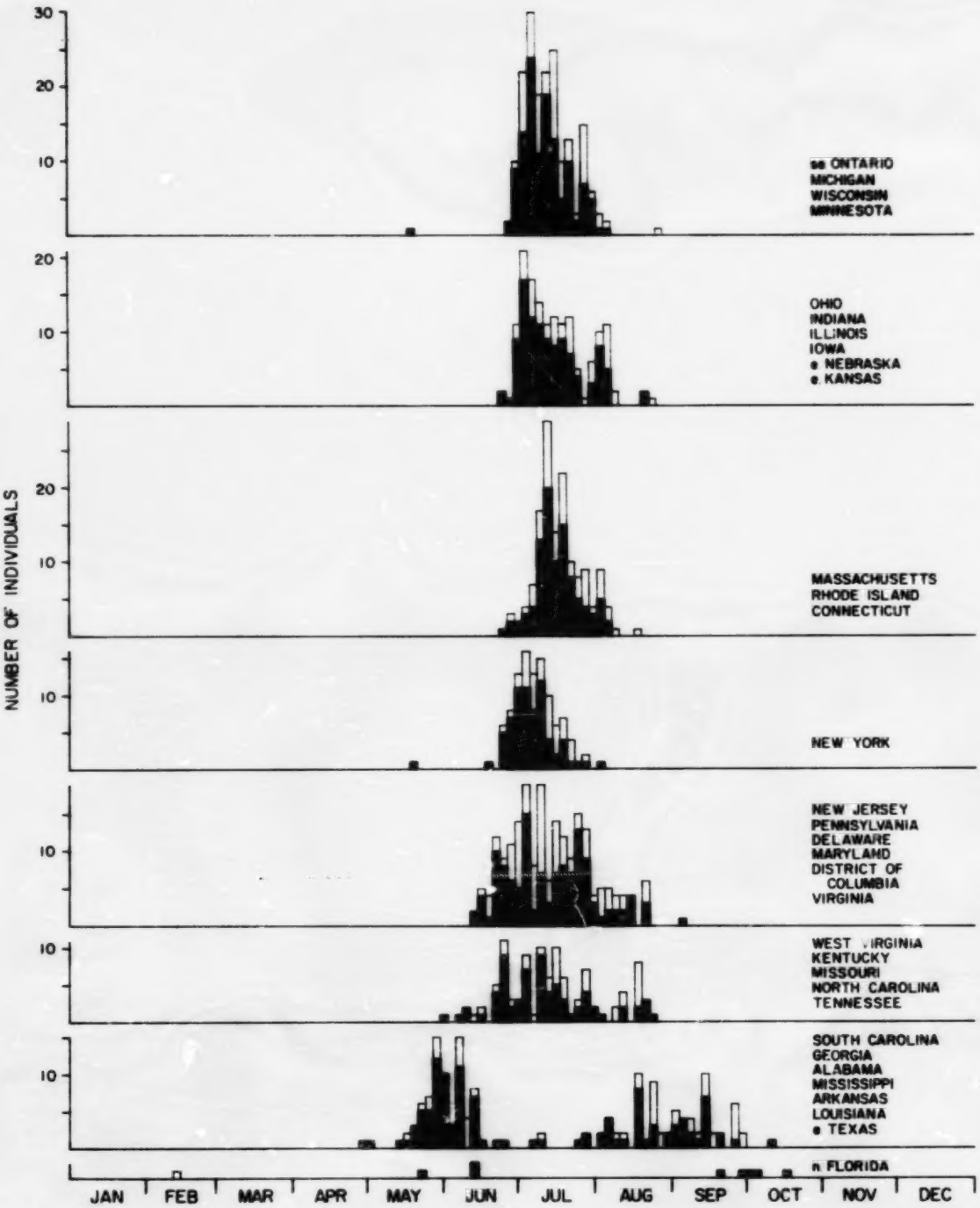

FIGURE 66.—Temporal distribution of wild-caught adults of *Wallengrenia egeremet* (based on material examined). Temporal class interval three days. Males black, females (stacked on males) white.

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TABLE 1.—Length (mm) of right primary of *Wallengrenia otho*.

Sample	*N*	Range	Mean with standard error	Standard deviation	Coefficient of variation
Virginia, North Carolina, South Carolina, Georgia, Alabama					
♂	50	11.7–13.6	12.82 ± 0.06	0.43	3.35
♀	42	12.0–14.5	13.50 ± 0.07	0.45	3.33
Mississippi					
♂	69	11.8–14.1	13.18 ± 0.05	0.42	3.19
♀	47	12.7–14.6	13.56 ± 0.05	0.37	2.73
Florida					
♂	53	12.4–15.4	13.94 ± 0.09	0.63	4.52
♀	27	13.0–15.2	14.38 ± 0.13	0.65	4.52
Arkansas, Missouri, SW Tennessee					
♂	8	13.3–14.4	13.85 ± 0.17	0.49	3.54
♀	11	13.4–15.0	14.35 ± 0.14	0.47	3.28
E Texas					
♂	68	12.0–15.4	13.85 ± 0.08	0.68	4.91
♀	49	12.5–16.2	14.69 ± 0.10	0.67	4.56
Austin, Texas spring 1966 & 1967					
♂	65	13.0–15.4	14.50 ± 0.07	0.54	3.72
♀	83	14.2–16.3	15.37 ± 0.05	0.47	3.06

as areal continuity when two or more states were lumped. A glance at the maps and the lists of material examined will show that, as might be expected, no sample is drawn from its sample area uniformly.

Other sources of sample heterogeneity include weather, which may significantly affect adult size. Specimens of *W. egeremet* taken at the end of a prolonged drought in the coastal plain of South Carolina (2♂ 4♀, Plantersville, Georgetown County, 25 August 1974, J.M. and S.N. Burns) were much smaller than average: the females (13.3, 13.3, 13.4, 13.4 mm) were at the lower limit of the observed range in female winglength (13.3–16.0 mm) in the entire southeastern sample (Table 2); and the males (12.6, 12.8 mm) were just above the lower limit of the observed range in male winglength (12.5–15.5 mm). (Winglengths of a dozen specimens of *otho* taken at the same time and place were more or less average except for two small males, both 12.1 mm.) Numerous specimens of *otho* taken during the favorably moist and mild spring of 1967 at Austin, Texas, in connection with a study of mating frequency (Burns, 1968) were much larger than average (Table 1). The Austin sample was kept separate (rather than lumped into east Texas) not only because the exceptionally large specimens from 1967 make up 89% of the sample but also because the sample represents a point in space and little more than a point in time. By contrast, all other samples of both species comprise small contributions from many different places and many different times. Such pooling tends to even out the kind of environmental bias under discussion. As a result, means are probably not distorted seriously, although variation within samples is increased.

SEXUAL DIMORPHISM

In both species of *Wallengrenia*, females average significantly larger than males. In the various geographic samples of *W. otho* (Table 1), the female edge in mean winglength varies from 0.38 mm to 0.87 mm; in *W. egeremet* (Table 2), from 0.41 mm to 0.76 mm. For both species, the average female edge is about 0.6 mm. In *t*-tests

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TABLE 2.—Length (mm) of right primary of *Wallengrenia egeremet*.

Sample	N	Range	Mean with standard error	Standard deviation	Coefficient of variation
New York					
♂	65	13.0–14.8	13.81 ± 0.05	0.40	2.90
♀	31	13.1–15.7	14.40 ± 0.11	0.60	4.17
Michigan					
♂	50	12.4–15.0	13.84 ± 0.08	0.59	4.26
♀	27	13.0–15.3	14.30 ± 0.13	0.66	4.62
Massachusetts, Connecticut					
♂	49	12.4–15.0	13.84 ± 0.07	0.48	3.47
♀	33	13.2–15.5	14.51 ± 0.10	0.58	4.00
New Jersey					
♂	39	12.8–15.8	13.94 ± 0.09	0.59	4.23
♀	43	13.8–15.8	14.70 ± 0.08	0.50	3.40
Indiana					
♂	45	11.8–15.1	14.12 ± 0.08	0.56	3.97
♀	11	13.8–15.9	14.53 ± 0.21	0.69	4.75
Delaware, Maryland, District of Columbia, Virginia					
♂	52	12.8–15.4	14.15 ± 0.08	0.57	4.03
♀	15	13.8–15.8	14.66 ± 0.14	0.55	3.75
Kentucky, Tennessee					
♂	20	13.6–15.0	14.33 ± 0.08	0.35	2.44
♀	11	13.7–15.4	14.75 ± 0.16	0.54	3.66
Illinois, Iowa, Missouri, E Nebraska, E Kansas					
♂	45	13.4–16.0	14.72 ± 0.08	0.54	3.67
♀	31	14.2–17.0	15.42 ± 0.11	0.63	4.09
South Carolina, Georgia, Alabama, Mississippi, Arkansas, E Texas					
♂	73	12.5–15.5	13.93 ± 0.07	0.63	4.52
♀	43	13.3–16.0	14.43 ± 0.10	0.67	4.64
Florida					
♂	12	13.8–16.1	14.78 ± 0.22	0.77	5.21
♀	3	15.1–15.6	15.27		

of the significance of the difference between male and female sample means, *P* was usually less than .001, ranging as high as .02–.05 only in two cases involving small sample size.

GEOGRAPHIC VARIATION

Both *W. otho* and *W. egeremet* increase significantly in size to the south and to the west, but the parallel cannot be pushed much beyond this level of abstraction. Smallest through the bulk of the Southeast, *otho* becomes notably large in Florida and, again, in the westernmost states of its range (Tables 1 and 3). *Wallengrenia egeremet* gets significantly bigger from north to south—in the interior (from Michigan to Tennessee) as well as along the coast (from Massachusetts to Virginia)—but reverses this trend in the southern tier of states (South Carolina to Arkansas and Texas) before becoming extra large in Florida; it also gets extra large to the west, but only in the northern part of its range (Illinois to Nebraska and Kansas; Tables 2 and 4).

The seemingly anomalous north-to-south size

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TABLE 3.—Significance of the difference between mean lengths of right primary in samples of male *Wallengrenia otho* from various areas. All possible comparisons are made. For each comparison the number of degrees of freedom, the value of Student's *t*, and *P* are shown (from top to bottom) in the appropriate square.

Mississippi	117 4.62 <.001		
Florida	101 10.52 ≪.001	120 8.00 ≪.001	
Texas	116 9.53 ≪.001	135 7.00 ≪.001	119 .74 .40–.50
	Virginia North Carolina South Carolina Georgia Alabama	Mississippi	Florida

decrease in *egeremet*—which occurs across the entire east-west width of its range—correlates with the shift from a univoltine to a bivoltine condition and probably stems directly therefrom: although the season is mild longer and the overall larval food supply greater, the increase in available time or food may not be quite enough to permit two generations within one year to produce adults as large as the single-brooded ones immediately to the north.

INTERSPECIFIC DIFFERENCE

With due regard for sexual dimorphism, geographic variation, and differences in spatial distribution, comparison of Tables 1 and 2 shows that, despite extensive overlap in winglength, *W. egeremet* is essentially a larger species than *W. otho* in eastern North America. Northeastern *egeremet* averages significantly larger than northeastern *otho;* northwestern *egeremet,* than northwestern *otho;* and Floridian *egeremet,* than Floridian *otho:* in these comparisons, the difference in mean winglength approaches or equals one millimeter. In their main area of sympatry—the southern coastal states exclusive of Florida—*egeremet* again averages about a millimeter longer than *otho,* except to the west where, especially in Texas, *otho* comes to equal or even exceed *egeremet* in mean winglength.

Material Examined

Prolonged and widespread confusion of *W. otho* and *W. egeremet* calls for detailed lists of specimens examined. Know the system of organization and condensation before entering the lists and fighting through. It stems from the one used for *Erynnis* (Burns, 1964:19–20) but differs in minor ways.

Each entry comprises (1) locality, (2) date, and (3) number of males and/or females; it also includes (4) collector(s), when known, and (5) any museum(s) holding some or all of the material cited. Names of museums (abbreviated in parentheses) are spelled out on page 3. I do not cite private collections because sooner or later specimens are given away, exchanged, sold, discarded, eaten, or otherwise destroyed—and owners die. For each species, I arrange entries primarily by locality and secondarily by date, as elaborated below. Besides numbers of males and females from each particular place and time, I give total numbers examined for countries and for states (or provinces).

Entries are ordered alphabetically by (1) country; (2) state (including District of Columbia) or province; (3) county, parish, independent city, district, or municipal region; and (4) specific locality. When a locality is no more specific than county, the entry comes right after the name of the county, ahead of the alphabetic sequence of specific localities. Localities that are elusive because they are extinct, too local, or too politically or geomorphically broad are relegated to *County undetermined* at the end of the alphabetic sequence of counties for the appropriate state.

Original label data are adjusted as required: localities are carefully placed to county (or the equivalent) whenever county is lacking; misspellings and other errors are corrected; information is occasionally added to locality designations so

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TABLE 4.—Significance of the difference between mean lengths of right primary in samples of male *Wallengrenia egeremet* from various areas. All possible comparisons are made. For each comparison the number of degrees of freedom, the value of Student's *t*, and *P* are shown (from top to bottom) in the appropriate square.

Michigan	113 .33 .70–.80								
Massachusetts Connecticut	112 .36 .70–.80	97 0 1.00							
New Jersey	102 1.34 .10–.20	87 .79 .40–.50	86 .88 .30–.40						
Indiana	108 3.40 <.001	93 2.35 .02–.05	92 2.61 .01–.02	82 1.44 .10–.20					
Delaware Maryland District of Columbia Virginia	115 3.81 <.001	100 2.70 .001–.01	99 2.94 .001–.01	89 1.71 .05–.10	95 .26 .70–.80				
Kentucky Tennessee	83 5.21 <.001	68 3.49 <.001	67 4.10 <.001	57 2.73 .001–.01	63 1.56 .10–.20	70 1.32 .10–.20			
Illinois, Iowa Missouri Nebraska, Kansas	108 10.20 ≪.001	93 7.51 ≪.001	92 8.36 ≪.001	82 6.37 <.001	88 5.17 <.001	95 5.09 <.001	63 2.96 .001–.01		
South Carolina Georgia, Alabama Mississippi Arkansas, Texas	136 1.30 .10–.20	121 .79 .40–.50	120 .84 .40–.50	110 .08 >.90	116 1.67 .05–.10	123 1.99 .02–.05	91 2.73 .001–.01	116 6.95 ≪.001	
Florida	75 6.57 <.001	60 4.64 <.001	59 5.31 <.001	49 3.98 <.001	55 3.39 .001–.01	62 3.22 .001–.01	30 2.28 .02–.05	55 .31 .70–.80	83 4.20 <.001
	New York	Michigan	Massachusetts Connecticut	New Jersey	Indiana	Delaware Maryland District of Columbia Virginia	Kentucky Tennessee	Illinois Iowa Missouri Nebraska Kansas	South Carolina Georgia Alabama Mississippi Arkansas Texas

minutely local as to convey almost nothing or deleted from those that are overly detailed; measures of distance and elevation are converted to the metric system. N, S, E, and W, which are used alone and together (e.g., SW) for cardinal directions and their hybrids, are to be read "north of," "southwest of," and so forth.

At the end of an entry, a semicolon in place of a period signals that the previous locality designation still applies; it is not repeated. An elliptic phrase such as "3 km W" following a semicolon means "3 kilometers west of the last-named locality."

Dates are written day/month/year, with the

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month reduced to its first three letters and the year to its last two digits (e.g., 14 Aug 54)—except that nineteenth-century years keep all four digits. Omissions and imprecisions in original data are reflected in the citations: 1–9 Sep = the first to ninth of September, 10 Jun = the tenth of June, Jun 10 = June 1910, 00 = 1900, and "no date" = no date. Multiple entries from the same locality are ordered chronologically by (1) year, (2) month, and (3) day, any entries that do not include year coming after those that do.

I routinely put my machine-printed, hand-dated determination label on each specimen examined, which is a little like a dog urinating on the plants along its beat.

Wallengrenia otho

UNITED STATES.—608♂ 478♀, $N = 1086$. ALABAMA.—19♂ 9♀. *Baldwin County:* Seminole, 6 Sep 84, 2♂ 1♀, J.M. Burns (USNM). *Houston County:* Cowarts, 1–3 Aug 16, 1♀ (AMNH). *Jefferson County:* Birmingham, 8–9 Aug 16, 2♂ (AMNH); 10 Aug 16, 2♂ 1♀ (AMNH). Greene, 11 Aug 16, 1♀ (AMNH). Ketona, 12 Aug 16, 2♂ (AMNH). *Mobile County:* Chickasaw, 1 Oct 22, 1♂, W.C. Dukes (BMNH); 1 Sep, 1♂ (AMNH); 2 Sep, 1♂ (AMNH); 4 Sep, 2♀ (AMNH); 11 Sep, 1♂ (AMNH); no date, 2♂ (AMNH). Mobile, 31 Aug, 1♂ 1♀ (AMNH); 8 Sep, 1♀ (AMNH); 26 Sep, 1♀ (AMNH); 1 Oct, 1♂ (AMNH); no date, 2♂ (AMNH). Spring Hill, 27 Apr 22, 1♂ (AMNH).

ARKANSAS.—8♂ 9♀. *Carroll County:* Eureka Springs, 24 May 64, 1♂, J.R. Heitzman; 23 May 65, 1♂, J.R. Heitzman; 25 May 66, 1♂, J.R. Heitzman; 30 May 66, 3♀, J.R. Heitzman. *Cleburne County:* Quitman, 26 May 33, 1♀ (AMNH). *Faulkner County:* Hope Hill Farm, near Enders, 2 Jun 64, 1♂, H.A. Freeman (USNM). *Garland County:* Hot Springs, 23 Aug 57, 1♀, S. Parshall (UL). *Hempstead County:* Hope, no date, 1♀ (AMNH). *Washington County:* 8 km S Fayetteville, near Greenland, 11 Sep 66, 1♀, J.R. Heitzman; 3 Sep 67, 1♂, J.R. Heitzman; 10 Sep 67, 1♀, J.R. Heitzman. 8 km S Fayetteville, 1.6 km E airport on West Fork White River, 22 Aug 71, 1♂, J.R. Heitzman. Lake Wedington Park, W Fayetteville, 29 May 66, 2♂ 1♀, J.R. Heitzman.

FLORIDA.—128♂ 55♀. *Alachua County:* Gainesville, 25 Apr 25, 1♂, D.M. Bates (UMMZ); 30 Mar 29, 1♂ (AMNH). Hawthorne, 28 Jul 46, 1♂, J.C. Symmes. Island Grove, 8 Apr, 2♀ (AMNH); 27 Apr, 1♀ (AMNH); 30 Apr, 1♂ (AMNH); 1 May, 1♀ (AMNH). *Brevard County:* Eau Gallie, 24 Apr 16, 1♂, E.L. Bell (AMNH). Merritt Island, 22 May 40, 2♂ 1♀ (USNM); 30 Sep, 1♂ (CM). Rockledge, 10 Apr 1884, 1♂ (MCZ). *Charlotte County:* U.S. route 41, 24 km N North Fort Myers, 30 Mar 61, 1♂ 1♀, C.V. Covell, Jr. *Collier County:* Chokoloskee, May, 1♀ (AMNH). Collier-Seminole State Park, 11 Apr 66, 1♀, C.V. Covell, Jr.; 4 Apr 67, 1♂, C.V. Covell, Jr. (UL). Royal Palm Hammock, 25 Feb 20, 1♂, W.C. Wood (AMNH). *Dade County:* Coconut Grove, 15–21 Mar 45, 1♂, Semple (CM). Fairchild Tropical Garden, 13 Apr 75, 1♀, H.L. King (AME). Florida City, 12 Oct 32, 1♂ (AMNH); 3 Mar 33, 1♀ (AMNH); 6 May 33, 1♀ (AMNH); 26 May 33, 1♂ (AMNH); 1 Aug 36, 1♂ (AMNH); 19 Sep 36, 1♀ (AMNH); 15 May 37, 1♂ (AMNH); 27 May 37, 1♂ (AMNH); 31 May 37, 1♂ (AMNH); 19 Aug 37, 1♂ (AMNH); no date, 1♂ (CM). Homestead, 19 Mar 70, 1♂, L.D. and J.Y. Miller, A.C. Allyn (AME); 31 Mar 70, 1♂, L.D. and J.Y. Miller (AME). Miami, 24–30 Jul, 1♂ (USNM); 24–30 Aug, 1♀ (USNM); 1–7 Oct, 1♂ (USNM); 8–15 Oct, 1♂ 1♀ (USNM); no date, 2♂ 2♀ (USNM). Royal Palm Park, 2 Mar, 1♂, F.M. Jones (USNM); 8 Mar, 1♀, F.M. Jones (USNM); 16 Mar, 1♂, F.M. Jones (USNM); 20 Mar, 1♀, F.M. Jones (USNM); 1–7 Jul, 1♂ (CM). *De Soto County:* Arcadia, 28 Apr, 1♂ (USNM). *Duval County:* Jacksonville, 2 Apr 22, 1♂ (AMNH). *Escambia County:* Pensacola, 11–14 Oct 14, 1♂ (AMNH). *Flagler County:* Bunnell, 24 Apr 54, 1♀, J. Bauer (CM). Pellicer Creek, 21 km N Bunnell, 24 Apr 54, 1♂, J. Bauer (CM); 5 May 54, 1♂, J. Bauer (USNM). *Franklin County:* west edge Carrabelle, 9 Sep 84, 1♂ 1♀, J.M. Burns (USNM). U.S. route 98, 0.6 km S junction with state secondary route 370, 5 km N Alligator Point, 9 Sep 84, 1♂, J.M. Burns

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(USNM). *Highlands County:* Archbold Biological Station, Lake Placid, 15–31 Jul 48, 3♂ 3♀, A.B. Klots (AMNH). *Hillsborough County:* Stemper, 10 Apr 14, 1♂ (USNM). Tampa, Mar 39, 1♂, F.W. Case (USNM); 28 Feb, 1♂ (AMNH); 7 Mar, 5♂ (AMNH); 22 Mar, 1♂ (AMNH); 31 Mar, 1♂ (AMNH); 14 Apr, 1♂ (AMNH). *Jefferson County:* Monticello, 31 Mar 29, 1♂ (AMNH). *Lee County:* Fort Myers, 2 Oct 65, 1♀, L. Harris. *Leon County:* Copeland, 19 Aug 71, 1♂ (AMNH). *Levy County:* Cedar Key, 26 Sep 72, 1♂, F.C. Tingle (AMNH). Sumner, 19 May 56, 2♂, J.C. Symmes. *Madison County:* 10.5 km ESE Lee, 25 Mar 80, 1♂, J.M. and S.N. Burns (USNM). *Manatee County:* Parrish, no date, 1♂ (AMNH). *Manatee and Sarasota counties:* Myakka River State Park, 29 Mar 61, 1♂, C.V. Covell, Jr. *Martin County:* Port Sewall, 17–19 Mar 43, 1♀, L.J. Sanford (AMNH); 20 Mar 43, 2♂, L.J. Sanford (AMNH); 1–7 Mar 44, 1♀, L.C. Sanford (AMNH); 18 Mar 44, 1♀, L.C. Sanford (AMNH); 17 Feb 45, 1♂, C. Ponsonby (AMNH). *Monroe County:* northeast corner Monroe County, 8–14 Jul, 1♂ (CM). Big Pine Key, 5–9 Mar 51, 2♂, L.J. Sanford (AMNH); 4–9 Apr 51, 1♂, L.J. Sanford (AMNH); 8 Dec 60, 1♀, J.C. Symmes; 11 Dec 60, 1♀, J.C. Symmes; 12 Dec 60, 1♀, J.C. Symmes; 16 Apr 75, 1♂, H.N. Darrow (USNM); 19 Apr 78, 1♂, H.N. Darrow (USNM); 1 Jul, 1♀, M. Bates (MCZ); Watsons Hammock, 17 Feb 54, 2♂, L. Harris, Jr. (AMNH). Key Largo, 8 Jan 32, 2♂, A.S. Pinkus (AMNH); 23 Mar 63, 1♂, C.V. Covell, Jr.; 7 Apr 67, 2♂, C.V. Covell, Jr.; 11 Aug 67, 1♂, S. Kemp (AMNH); 24 Mar 79, 1♀, D.B. Adelberg (USNM). northern Key Largo, 27.4 km NE Tavernier, 31 Mar 70, 1♂, L.D. and J.Y. Miller (AME); 3 Apr 70, 1♂, L.D. and J.Y. Miller (AME). Key West, 8 Feb 1869, 1♂ 1♀ (MCZ); 1 Mar 46, 1♂, King; 16 May 74, 1♂, C.V. Covell, Jr.; 22–30 Jun, 2♂ 1♀ (CM). Sugarloaf Key, 17 Mar 73, 2♂, R.C. Goulet (AMNH); 18 Mar 73, 1♀, R.C. Goulet (AMNH); 23 Oct 73, 1♂, R.C. Goulet (AMNH); 19 Nov 73, 1♂, R.C. Goulet (AMNH); 16 Jan 74, 3♂, R.C. Goulet (AMNH). Upper Matecumbe Key, 6 Jul 72, 3♂ 1♀, D.B. Adelberg (USNM). *Orange County:* Ocoee, 14 Apr 38, 1♂ (AMNH). Orlando, 1 Oct 47, 1♂ (AMNH). Winter Park, 21 Mar 38, 1♂, F.E. Lutz (AMNH); 1 Jul 57, 1♀ (UL); Jul 57, 1♂ (UL). *Palm Beach County:* vicinity Boynton Beach, 8 Jul 72, 1♀, D.B. Adelberg (USNM). Jupiter, Mar 21, 1♂, W.C. Wood (AMNH). North Palm Beach, 30 Mar 63, 1♂, J.H. Hessel (AMNH). *Pasco County:* Dade City, Sep, 1♂ (USNM). *Pinellas County:* Gulfport, 4 Mar 25, 1♂, F.M. Gaige (UMMZ). Saint Petersburg, 10 Apr 16, 1♂ (USNM); 17 Apr 16, 1♂ (USNM); 20 Apr 16, 1♂ (USNM); Mar 39, 1♂, F.W. Case (USNM). *Polk County:* Lakeland, 5 Feb 37, 1♂, H.A.J. McElhose (AMNH). *Putnam County:* Bostwick, 30 Apr 54, 1♂, J. Bauer (CM). *Saint Johns County:* 4.8 km S Saint Augustine, Anastasia Park, 3 May 54, 1♂, J. Bauer (CM). *Saint Lucie County:* U.S. route 1, 3.2 km S Port Saint Lucie, 1 Apr 61, 1♂, C.V. Covell, Jr. *Santa Rosa County:* Navarre, 8 Sep 84, 1♂ 1♀, J.M. Burns (USNM). *Sarasota County:* 11.3 km E main entrance to Myakka River State Park on state route 72, 12 May 71, 1♂, L.D. and J.Y. Miller (AME); 4.8 km W . . . , 12 May 71, 1♀, L.D. and J.Y. Miller (AME). SE Myakka River State Park on state route 72, 31 Mar 68, 1♂, C.V. Covell, Jr. (AME). *Volusia County:* Daytona, 26 Sep 71, 2♂ 3♀, G.W. Rawson (USNM); 3 Oct 71, 3♂ 1♀, G.W. Rawson (USNM). New Smyrna Beach, 14 Apr 57, 1♀, J.B. Ziegler (AMNH); 17 Sep 60, 1♂, G.W. Rawson (UL); 18 Apr 61, 1♂, G.W. Rawson (UL); 24 May 69, 1♀, G.W. Rawson (USNM); 4 Jul 71, 1♀, G.W. Rawson (USNM); 13 Sep 71, 1♂, G.W. Rawson (USNM); 8 Oct 71, 1♀, G.W. Rawson (USNM); 9 Oct 71, 1♂, G.W. Rawson (USNM); 13 Oct 71, 1♀, G.W. Rawson (USNM); 5 Jul 73, 1♂, G.W. Rawson (UL); 19 Sep 73, 1♀, G.W. Rawson (UL); 76, 1♀, G.W. Rawson (USNM). Samsula to De Land, 19 Apr 57, 1♀, J.B. Ziegler (AMNH). near Samsula, 22 Apr 61, 1♂ 1♀, G.W. Rawson (UL). *Wakulla County:* 4 km E Newport, 9 Sep 84, 1♂ 1♀, J.M. Burns (USNM). *Walton County:* 5 km W Santa Rosa Beach, 8 Sep 84, 2♂, J.M. Burns (USNM). *County undetermined:* Indian River, no date, 1♀ (USNM). Lake Okeechobee, east side, 22–30 Jun, 1♂ (CM).

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GEORGIA.—32♂ 24♀. *Bibb County:* Macon, 25 Aug 60, 1♂ 1♀, G.W. Rawson (UL). *Bryan County:* 1.5 km N Blitchton, 30 May 71, 2♂, R.T. Arbogast (AMNH); 31 May 71, 1♀, R.T. Arbogast (AMNH). *Camden County:* 17 Aug 49, 1♀ (USNM). *Chatham County:* Savannah, 20–24 May 55, 2♀, E.P. Mellon (CM). *Clayton County:* 4 Aug 45, 1♂, J.C. Symmes. *Clinch County:* 3 km SE Council on state route 94, 19 May 81, 2♂, E.L. Quinter. *Decatur County:* between Bainbridge and Climax, 28 Jul 16, 1♂ 1♀ (AMNH). Brinson, 29 Jul 16, 1♀ (AMNH). *De Kalb County:* Stone Mountain, 12 Aug 50, 3♂, L. Harris III. *Fulton County:* Hapeville, 1 Aug 45, 1♂, J.C. Symmes. *Fulton and De Kalb counties:* Atlanta, 4 Jun 40, 1♂, J.C. Symmes; 14 Jun 40, 1♂, J.C. Symmes; 24 Aug 41, 1♂, P.W. Fattig (USNM); 4 Jun 44, 1♂, J.C. Symmes; 14 Aug 49, 1♂ 1♀ (USNM); 18 Aug 49, 1♀ (USNM); 20 May 50, 1♂; 18 May 55, 1♂, J.C. Symmes; 24 May 55, 1♂, J.C. Symmes; 28 May 55, 1♂, J.C. Symmes; 7 jun 57, 1♀, J.C. Symmes; 12 Jun 59, 1♂, J.C. Symmes. *Grady County:* 31 Jul 64, 1♀, L. Harris, Jr. *Liberty County:* Saint Catherines Island, 18–21 Sep 72, 1♀, F.C. and B.J. Thompson (AMNH). *McIntosh County:* Sapelo Island, 17 May 78, 2♀, J.R. Powers (USNM); 18 May 78, 5♂ 2♀, J.R. Powers (USNM). *Screven County:* 30 Apr 46, 1♀, 0. Buchholz (AMNH); 10 Apr 47, 1♀, 0. Buchholz (USNM); 6 May 47, 1♀, 0. Buchholz (USNM); 19 May 47, 1♀, 0. Buchholz (USNM); 13 Sep 47, 1♂, 0. Buchholz (USNM). Georgia/South Carolina state line on U.S. route 301, 3 Jun 68, 1♂, Wood and Davidson (USNM). Millhaven, 25 May 68, 3♂ 2♀, B. Mather. *Thomas County:* Thomasville, 22–26 Jul 16, 1♂ (AMNH). *Tift County:* Tifton, 16 May, 1♀ (AMNH). *Ware County:* Deenwood, Waycross, 16–18 Jul 16, 1♀ (AMNH).

INDIANA.—1♂. *Lake County:* Hessville, 4 Jul, 1♂, H. Ramstadt (UMMZ).

KENTUCKY.—1♂. *Jefferson County:* Louisville, no date, 1♂ (USNM).

LOUISIANA.—11♂ 6♀. *De Soto Parish:* Holly, no date, 2♀ (AMNH). *Grant Parish:* Pollock, 18 Apr 35, 1♂ (AMNH); 12 May 35, 1♀ (AMNH); 6 Jul 35, 1♂ (AMNH). *Jefferson Parish:* Grand Isle, 25 Aug 69, 1♂, G.T. Strickland (AMNH). Harahan, 18 Aug 44, 2♂, W.D. Field (USNM); 21 Aug 44, 1♂, W.D. Field (USNM). *Orleans Parish:* New Orleans, no date, 1♂ (AMNH). *Rapides Parish:* Alexandria, 12 May 35, 1♂ (AMNH); 26 May 35, 1♂ 2♀ (AMNH). *Saint Landry Parish:* Opelousas, 22 Apr 1897, 1♂, G.R. Pilate (CM); 22 May 1897, 1♂, G.R. Pilate (CM). *Winn Parish:* Winnfield, 2 Jun 18, 1♀ (MCZ).

MARYLAND.—7♂ 8♀. *Anne Arundel County:* Fort Smallwood, 24 Aug 54, 1♂, W.A. Andersen. near Galesville, 14 Jun 52, 1♂, W.A. Andersen. *Calvert County:* Chesapeake Beach, 18 Aug 51, 1♂, R.S. Simmons (USNM); 13 Aug 52, 2♂, W.A. Andersen. *Charles County:* Liverpool Point, near Nanjemoy, 10 Jun 76, 1♀, W.A. Andersen; 26 Aug 76, 1♀, W.A. Andersen. Port Tobacco, 15 Aug 68, 2♀, W.A. Andersen; 6 Jun 74, 1♂, W.A. Andersen. Swan Point Neck, 21 Aug 69, 1♀, W.A. Andersen. *Saint Marys County:* Maddox, 13 Jun 74, 1♀, W.A. Andersen. Saint James, near Dameron, 14 Sep 67, 1♀, W.A. Andersen. *Somerset County:* Fairmount, 19 Aug 76, 1♂, W.A. Andersen. Saint Stephen, near Princess Anne, 11 Jun 70, 1♀, W.A. Andersen.

MISSISSIPPI.—107♂ 60♀. *Adams County:* Pipes Lake, 25 May 69, 2♂ 1♀, B. and K. Mather. *Claiborne County:* Reganton, 1 Sep 58, 1♂, B. and K. Mather; 1 Sep 58, 1♂, M. and E. Roshore. *Clarke County:* Quitman, 30 Apr 55, 1♀, B. and K. Mather. *Clay County:* Cedarbluff, 1 Jun, 1♂ 2♀ (AMNH); 12 Aug, 1♂ (AMNH); 13 Aug, 1♂ (AMNH). *Copiah County:* Georgetown, 29 May 60, 2♀, B. and K. Mather. *Forrest County:* Hattiesburg, 23 Sep 51, 1♀, B. and K. Mather. Shelby State Park, 3 Aug 58, 1♂, M. and E. Roshore; 6 Sep 58, 2♂ 1♀, M. and E. Roshore; 29 Apr 61, 1♂, B. and K. Mather; 30 May 66, 2♀, M. and E. Roshore. *George County:* Benndale, 1 Aug 60, 1♂, B. and K. Mather. *Hancock County:* Bay Saint Louis, 24 Aug 52, 1♂, B.L. Monroe (UL); 3 Aug 58, 1♂ 2♀, B. and K. Mather; 3 Aug 58, 1♂ 1♀, M. and E. Roshore; 4 Jun 63, 1♂, B. and K. Mather; 4 Jun 63, 1♀, M. and E. Roshore; 9 Aug 70, 1♂, R. Kergosien (AMNH); 28 Aug 70, 1♂

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(AMNH); 30 Aug 70, 1♂, R. Kergosien (AMNH); 8 km N, 14 May 71, 1♂, R. Kergosien (AMNH). Bosworths, 25 Apr 71, 1♂, R. Kergosien (AMNH). Catahoula Creek, 6 Sep 70, 1♂ (AMNH). *Harrison County:* Biloxi, 10 Apr 10, 1♂, F.M. Jones (USNM); 22 Apr 10, 1♀, F.M. Jones (USNM); 26 May 64, 1♂, Taylor; 1 Jun 69, 1♀, B. and K. Mather. D'Iberville, 27 Aug 66, 1♂, Taylor. Gulfport, 13 Aug 57, 1♀, M. and E. Roshore. Lyman, 29 Apr 67, 2♂ 1♀, M. and E. Roshore. Mississippi City, 3 Aug 58, 1♂, M. and E. Roshore. *Hinds County:* Bolton, 1 Sep 57, 1♂, B. and K. Mather. Brownsville, 30 May 58, 3♀, B. and K. Mather; 30 May 58, 2♂, M. and E. Roshore; 1 Jun 58, 2♂ 1♀, B. and K. Mather; 1 Jun 58, 1♀, M. and E. Roshore; 7 Jun 58, 1♀, B. and K. Mather; 31 Aug 58, 1♀, B. and K. Mather; 31 Aug 58, 3♂ 1♀, M. and E. Roshore; 14 Sep 58, 1♀, M. and E. Roshore. Clinton, 14 May 50, 1♂, B. and K. Mather; 4 Jun 50, 1♀, B. and K. Mather; 27 May 51, 1♀, B. and K. Mather; 30 Sep 51, 1♂, B. and K. Mather; 12 Aug 53, 1♀, B. and K. Mather; 16 Aug 53, 1♀, B. and K. Mather; 29 Apr 54, 1♂, B. and K. Mather; 12 May 57, 1♂, B. and K. Mather; 16 Nov 57, 1♀, M. and E. Roshore; 14 May 61, 1♂, B. and K. Mather; 18 May 69, 1♀, M. and E. Roshore. Jackson, 13 Aug 55, 3♂, B. and K. Mather; 27 Jul 57, 1♂, B. and K. Mather; 3 Aug 57, 4♂, B. and K. Mather; 10 Aug 57, 1♂, B. and K. Mather. Raymond, 19 Jul 58, 1♀, M. and E. Roshore; 27 Jul 58, 1♀, M. and E. Roshore. *Jackson County:* Moss Point, 3 Oct 53, 1♂, B. and K. Mather; 31 Jul 60, 1♀, M. and E. Roshore. Ocean Springs, 2 Aug 58, 1♂, B. and K. Mather; 2 Aug 58, 1♀, M. and E. Roshore. Vancleave, 31 May 69, 10♂, B. and K. Mather. *Jefferson County:* Lorman, 23 May 54, 1♂, B. and K. Mather. *Lee County:* Tombigbee State Park, 21 May 72, 1♀, J. Bryson (AMNH). *Lowndes County:* Mayhew, 28 Aug 73, 1♀, C.T. Bryson (AMNH). *Madison County:* Natchez Trace, 6 Jun 54, 2♂ 3♀, B. and K. Mather; 9 Sep 56, 2♂, B. and K. Mather. *Oktibbeha County:* Adaton, 12 Sep 70, 1♂, C.T. Bryson (AMNH); 27 Aug 72, 1♂, J. Bryson (AMNH). Clayton Village, 5.5 km E Starkville, 9 Aug 72, 1♀, C.T. Bryson (AMNH); 1 Aug 73, 1♂, C.T. Bryson (AMNH); 22 Aug 73, 1♂, C.T. Bryson (AMNH). Dorman Lake, 9 km SE Longview, 30 May 73, 2♂ 4♀, C.T. Bryson (AMNH); 31 May 73, 1♂ 1♀, C.T. Bryson (AMNH); 14 Jun 73, 5♂, C.T. Bryson (AMNH); 16 Jun 73, 1♂, C.T. Bryson (AMNH); 20 Aug 73, 6♂, C.T. Bryson (AMNH); 21 Aug 73, 2♂, C.T. Bryson (AMNH); 24 May 74, 3♂, C.T. Bryson (AMNH); 24 Aug 74, 1♀, C.T. Bryson (AMNH). Sturgis, 15 May 72, 1♂, C.T. Bryson (AMNH); 3 Jun 74, 2♀, C.T. Bryson (AMNH). *Rankin County:* Goshen Springs, 6 Jun 54, 1♀, B. and K. Mather. Johns, 12 Aug 56, 1♂ 1♀, B. and K. Mather. *Simpson County:* Ina, 29 May 60, 2♂ 2♀, B. and K. Mather. *Smith County:* Raleigh, 30 Apr 55, 3♂ 1♀, B. and K. Mather. *Warren County:* Bovina, 31 Jul 55, 3♂ 1♀, b. and K. Mather; 7 Aug 55, 1♀, B. and K. Mather. Vicksburg, no date, 1♂, G. Dorner (USNM). *Wilkinson County:* Centreville, 17 Sep 55, 5♂ 1♀, B. and K. Mather. Pinckneyville, 12 Oct 69, 1♀, B. and K. Mather.

MISSOURI.—1♂ 3♀. *Barry County:* Roaring River State Park, 29 May 79, 1♂ 2♀, J.R. Heitzman. *Saint Louis County:* Big Bend and Sulfur Springs [roads], 10 Jun 78, 1♀, L. Robinson.

NORTH CAROLINA.—25♂ 19♀. *Brunswick County:* Leland, 14 Jun 41, 1♂ 1♀, 0. Buchholz (AMNH); 3 Sep 45, 4♂ 4♀, 0. Buchholz (AMNH); 6 Sep 45, 2♂ 1♀, 0. Buchholz (AMNH); 24 Aug 79, 1♀, J.M. Burns (USNM). *Carteret County:* Beaufort, 29 May 71, 1♀, J.B. Sullivan (AME). Junction state routes 101 and 181, 24 Sep 72, 1♂, J.B. Sullivan (AME). Sealevel, 25 Sep 81, 1♀, J.M. and S.N. Burns (USNM). *Craven County:* county road 1717, 13 Jun 71, 1♀, J.B. Sullivan (AME). *Dare County:* Buxton, 3 Jun 72, 1♀, S.M. Gifford (AME); 6 Jun 72, 5♂, S.M. Gifford (AME). Hatteras Island, 20 May 72, 2♂ 2♀, S.M. Gifford (AME); 30 May 72, 1♂, S.M. Gifford (AME). Manns Harbor, 18 May 73, 2♂, S.M. Gifford (AME). *Gaston County:* Gastonia, 29 Jul 39, 1♂, R.M. McKenzie (AMNH); 15 Aug 39, 1♂, R.M. McKenzie (AMNH); 21 Aug 39, 1♂, R.M. McKenzie (AMNH). *Hyde County:* Ocracoke, Ocracoke Island, 25 Sep 81, 1♀, J.M. and S.N. Burns (USNM). *Moore County:* Southern

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Pines, 2 Sep 54, 1♂, C.V. Covell, Jr.; 9 Sep, 1♀, A.H. Manee (AMNH). *New Hanover County:* Wilmington, 4 Jul, 1♀ (AMNH); 7 Jul, 1♀ (AMNH); 4 Sep, 1♂ (USNM). *Onslow County:* Camp Lejeune, 10 Jun 72, 1♂, J.B. Sullivan (AME). *Richmond County:* Hamlet, Aug 1892, 1♀ (USNM). *Robeson County:* Maxton, 1–15 May 43, 1♂, A.B. Klots (AMNH); Sep 43, 1♀, A.B. Klots (AMNH).

OKLAHOMA.—13♂ 5♀. *Comanche County:* Lawton, 9 Jun 65, 1♀, M. Toliver; 10 Jun 65, 1♂, M. Toliver; 12 Jun 65, 1♂, M. Toliver. *Craig County:* 11 km N Welch, 31 Aug 63, 1♂, G.F. Hevel (USNM). *Mayes County:* Locust Grove, 1 Sep 79, 1♀, J.M. Nelson. *McCurtain County:* Beavers Bend State Park, 22 Aug 65, 1♀, G.F. Hevel (USNM). *Payne County:* 9.7 km W Yale on state route 51, 24 Jun 66, 1♂, M. Toliver. *Tulsa County:* Bixby, 31 Aug 78, 1♂, J.M. Nelson; 4 Jun 79, 3♂, J.M. Nelson; 25 Aug 79, 1♀, J.M. Nelson. Keystone State Park, 14 Jun 78, 1♂, J.M. Nelson. *Wagoner County:* Lake Bixhoma, 29 May 78, 1♂ 1♀, J.M. Nelson; 2 Sep 78, 3♂, J.M. Nelson.

SOUTH CAROLINA.—40♂ 22♀. *Charleston County:* 16 km NE Charleston, 29 May 74, 1♂, R.B. Dominick. Edisto Island, 28 Jul 81, 1♀ (USNM). McClellanville, 21 May 68, 1♂, R.B. Dominick; 9 Jun 70, 1♀, R.B. Dominick; 22 Sep 72, 1♂, R.B. Dominick. Sullivans Island, 23 Jul 1897, 2♂ 1♀ (USNM); Aug 1897, 1♂ 1♀ (USNM). *Clarendon County:* Aug 1896, 1♂ (USNM); 2 Aug 1897, 1♀ (USNM); 3 Aug 1897, 1♂ (USNM); 5 Aug 1897, 2♂ (USNM). *Edgefield County:* Sleepy Creek, Aug 54, 5♂ 1♀, E.P. Mellon II (CM); 15 Apr 55, 1♂, E.P. Mellon II (CM); May 55, 1♂ 1♀, J. Bauer (CM). Sleepy and Stevens creeks, Aug–Sep 53, 3♂ 1♀, E.P. Mellon II (CM). *Georgetown County:* Plantersville, 25 Aug 74, 7♂ 5♀, J.M. and S.N. Burns (USNM); 22 Sep 80, 8♂ 7♀, J.M. Burns (USNM). *Horry County:* Galivants Ferry, 22 Aug 57, 3♂, J.M. and S.N. Burns (USNM); 23 Aug 57, 1♂, J.M. and S.N. Burns (USNM); 13 Sep 61, 1♀, J.M. Burns (USNM); 24 May 72, 1♂ 1♀, J.M. Burns (USNM).

TENNESSEE.—1♂ 1♀. *Shelby County:* Memphis, 23 Aug 67, 1♀, C.T. Bryson. *Wilson County:* Cedars of Lebanon State Park, 30 May 76, 1♂, L.D. and J.Y. Miller (AME).

TEXAS.—209♂ 249♀. *Angelina County:* Diboll, 21 Sep 73, 3♂ 3♀, W.W. McGuire (USNM). *Bastrop County:* Bastrop, no date, 1♂ (USNM). *Bexar County:* San Antonio, 19 May 25, 2♂ 2♀ (USNM); 27 May 25, 2♂ 1♀ (USNM); 22 May 66, 1♂, J.M. Burns (USNM); 21 May 73, 1♂, W.W. McGuire (USNM); no date, 1♂ (AMNH). *Blanco County:* no date, 1♂ (USNM). *Blanco and Burnet counties:* Shovel Mountain, 16–23 Apr, 1♀ (USNM); 24–30 Apr, 1♀ (USNM); 8–15 May, 1♀ (USNM); 16–23 May, 3♀ (USNM); 1–7 Jun, 4♂ 2♀ (USNM); 16–23 Sep, 1♀ (USNM); 24–30 Sep, 1♂ (USNM); 1–7 Oct, 1♂ (USNM); no date, 6♂ 6♀ (USNM). *Caldwell County:* 19 May 62, 2♂ 1♀, R.O. and C.A. Kendall (AME). *Cameron County:* Brownsville, 13 Mar, 1♂ (AMNH); 9 Apr, 2♂ (AMNH); 12 Apr, 1♂ (AMNH); 27 Apr, 1♀ (AMNH); 11 May, 1♂, G. Dorner (USNM); no date, 3♂ 2♀ (USNM). *Comal County:* 19 May 64, 3♂, R.O. and C.A. Kendall (AME). *Cooke County:* 14.5 km E Gainesville, 28 Aug 75, 1♂ 1♀, W.W. McGuire (USNM). *Dallas County:* 11 Jun 51, 1♂, H.V. Daly (AMNH). Dallas, 5 May 38, 2♂ 2♀ (AME); 29 May 51, 1♂, H.V. Daly (AMNH). near Irving, 15 Sep 79, 1♀, R.A. Rahn (USNM). Lancaster, 29 Jun 40, 1♂ (AMNH); 20 Aug 40, 2♂ (AMNH); 23 Aug 40, 1♂ (AMNH); 2 Oct 40, 2♂ (AMNH); 3 Oct 40, 1♂ 3♀ (AMNH). *Fayette County:* Black Jack Springs, 16 km W La Grange, no date, 2♀ (USNM). Ledbetter, 7 May 74, 4♂ 2♀, W.W. McGuire (USNM); 11 May 74, 2♂ 2♀, W.W. McGuire (USNM); 10 May 75, 1♂ 3♀, W.W. McGuire (USNM). *Freestone County:* 8 km W Buffalo, 18 May 75, 1♂ 1♀, W.W. McGuire (USNM). *Gonzales County:* Palmetto State Park, 6 Apr 67, 1♂, J.M. Burns (USNM). *Grayson County:* Hagerman Wildlife Refuge, 30 May 65, 3♂ 1♀, R.O. Kendall (AMNH). *Hardin County:* Honey Island, 3 Jun 73, 1♂, M.A. Rickard; 25 May 74, 1♂, W.W. McGuire (USNM). Kountze, 10 Jun 73, 1♂ 1♀, W.W. McGuire (USNM). *Harris County:* Houston, 27 Sep 66, 2♀, M.A. Rickard; 15 Sep 67, 2♂ 1♀, M.A. Rickard; 28 Sep 74, 1♀, M.A. Rickard; 8 Jun, 1♀ (USNM). Houston Memorial Park, 29 May 73, 1♂, F.R. Hedges. Lake Houston, 9 Sep 72, 1♂ 1♀, F.R. Hedges; 15 Sep 73, 2♂, F.R. Hedges. *Hays County:* 10 Oct

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65, 1♂ 2♀ (AMNH). *Hidalgo County:* Mission, 3 Sep 72, 1♂, W.W. McGuire (USNM). Santa Ana Wildlife Refuge, 28 Sep 73, 2♂, J.W. Tilden (USNM); 3 Oct 73, 1♂, J.W. Tilden (USNM); 9 Oct 73, 1♂ 1♀, J.W. Tilden (USNM); 11 Oct 73, 1♂, J.W. Tilden (USNM). *Jasper County:* U.S. route 190, 4 Sep 66, 1♂ 2♀, R.O. Kendall. *Kendall County:* Comfort, 15 Jun, 1♂, Lucock (CM); 8 Oct, 1♀, Lucock (CM); 22 Oct, 1♂, Lucock (CM); Oct, 1♂, Lucock (CM); no date, 1♂ 1♀, Lucock (CM). *Kerr County:* Kerrville, Sep 00, 1♂, H. Lacey (USNM); 2 Jun 06, 2♂, F.C. Pratt (USNM); May 07, 1♂, H. Lacey (AMNH); Jun 17, 1♂ 1♀ (AMNH); Jun 18, 1♂ (AMNH); 8 Jun 48, 1♀, 0. Buchholz (AMNH); 1–7 Jul, 1♂ (USNM); no date, 1♂ 1♀ (USNM). Kerrville State Park, 22 Apr 72, 1♀, W.W. McGuire (USNM). *Kimble County:* 4 Aug 65, 1♂ 1♀ (AMNH). *Leon County:* Buffalo, 18 May 75, 1♂ 1♀, W.W. McGuire (USNM). *Liberty County:* Cleveland, 6 Sep 71, 2♂ 1♀, M.A. Rickard. *Medina County:* Hondo Creek at U.S. route 90, 21 Apr 72, 1♂, W.W. McGuire (USNM). *Mills County:* Goldthwaite, 16 Sep 61, 1♂ 1♀, M. and E. Roshore. *Montague County:* 4 km SW Forestburg, 31 May 50, 1♀, B. Patterson (MCZ). 13.7 km W Nocona, 13 May 51, 2♂, H.V. Daly (AMNH). *Montgomery County:* near Spring, 13 Sep 66, 2♂, M.A. Rickard. *Newton County:* Deweyville, 19 Aug 72, 2♂, W.W. McGuire (USNM); 17 Aug 73, 1♂, W.W. McGuire (USNM). *Orange County:* Mauriceville, 20 Aug 72, 2♂, W.W. McGuire (USNM); 19 Sep 72, 4♂, W.W. McGuire (USNM); 25 Apr 73, 1♀, W.W. McGuire (USNM). *Smith County:* Tyler State Park, 23 May 73, 2♂ 2♀, W.W. McGuire (USNM). *Somervell County:* Glen Rose, 2 Oct 40, 1♀ (AMNH). *Tarrant County:* Benbrook Reservoir, 1 Sep 73, 2♂ 4♀, W.W. McGuire (USNM); 1 Oct 73, 1♂, W.W. McGuire (USNM). Fort Worth, 12 Sep 23, 1♂ (USNM). *Travis County:* Austin, 7 May 66, 8♂ 1♀, J.M. Burns (USNM); 10 May 66, 3♂, J.M. Burns (USNM); 14 May 66, 4♂, J.M. Burns (USNM); 25 May 66, 1♂, J.M. Burns (USNM); 18 Apr 67, 1♂, J.M. Burns (USNM); 20 Apr 67, 2♂ 3♀, J.M. Burns (USNM); 27 Apr 67, 11♂ 9♀, J M. Burns (USNM); 30 Apr 67, 12♂ 13♀, J.M. Burns (USNM); 1 May 67, 10♂ 13♀, J.M. Burns (USNM); 2 May 67, 11♂ 19♀, J.M. Burns (USNM); 7 May 67, 4♂ 1♀, J.M. Burns (USNM); 12 May 67, 22♂ 21♀, J.M. Burns (USNM); 15 May 67, 33♀, J.M. Burns (USNM); 16 May 67, 19♀, J.M. Burns (USNM); 22 May 67, 5♂ 22♀, J.M. Burns (USNM); 25 May 67, 17♀, J.M. Burns (USNM); 27 May 67, 1♀, J.M. Burns (USNM); 3 Jun 67, 1♀, J.M. Burns (USNM). *Wichita County:* 31 May 65, 1♀, R.O. Kendall (AMNH). *County undetermined:* Tiger Hill, no date, 1♀ (USNM).

VIRGINIA.—5♂ 8♀. *Chesapeake city (formerly the bulk of Norfolk County) and Virginia Beach city (formerly Princess Anne County):* North Landing River, 4 Sep 36, 1♂, A.H. Clark (USNM). *Gloucester County:* Severn, 31 Aug 41, 1♂ (USNM). *Mathews County:* Foster, 30 Aug 41, 1♂ (USNM). *Middlesex County:* Urbanna, 2 Sep 41, 1♀ (USNM). *Northampton County:* Custis Pond, 1 Jun 37, 1♀, F.M. Jones (USNM). *Suffolk city (formerly Nansemond County):* Dismal Swamp, near Magnolia, 13 Jun 62, 1♂, C.V. Covell, Jr. Jericho Ditch, near Suffolk, 7 Jun 59, 1♀. Suffolk, 9 Jun 41, 2♀, 0. Buchholz (AMNH); 2 Jun 44, 1♀, 0. Buchholz (AMNH); 21 May 45, 1♂, 0. Buchholz (AMNH); 25 May 45, 1♀, 0. Buchholz (AMNH). *Virginia Beach city (formerly Princess Anne County):* Lynnhaven, 13 Jun 38, 1♀, E.L. Bell (AMNH).

Wallengrenia egeremet

CANADA.—66♂ 26♀, *N* = 92. ONTARIO.—65♂ 26♀. *Essex County:* Point Pelee, 15 Jul 13, 1♂ 1♀, P.A. Taverner (CNC); 15 Jul 13, 1♀, C.H. Young (CNC); 29 Jul 28, 1♂ 1♀, W.F. Lawler (AMNH); 29 Jul 28, 1♂ 3♀, S. Moore (UMMZ). *Kent County:* Morpeth, 7 Jul 29, 3♂, W.F. Lawler (UMMZ); 13 Jul, 1♂, W.F. Lawler (AMNH). Rondeau Park, 28 Jul, 1♂, W.F. Lawler (AMNH). *Lambton County:* Grand Bend, 5 Jul 39, 2♂, T.N. Freeman (CNC); 6 Jul 39, 1♂, T.N. Freeman (CNC); 23 Jul 39, 1♀, T.N. Freeman (CNC). *Lincoln County:* Queenston, 11 Jul 04, 2♂ 2♀ (AMNH); 16 Jul 05, 1♂ 1♀ (AMNH). *Middlesex County:* Strathroy, 28 Jun 25, 1♂, H.F. Hudson (CNC). *Muskoka District:* Kahshe Lake, Aug 49, 1♂ (CM). *Norfolk County:* Simcoe, 1 Jul 39, 1♂,

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T.N. Freeman (CNC). *Ontario County:* Rouge Hill, 16 Jul 39, 1♂ 2♀, T. Irwin (CNC); 24 Jul 39, 1♂, T. Irwin (CNC). *Ottawa-Carleton municipal region:* Bear Creek, Carlsbad Springs, 28 Jul 25, 1♂, F. Ide (CNC). Merivale, 5 Jul 52, 1♀, D.C. Ferguson (AME). Ottawa, 4 Jul 52, 1♂, D.C. Ferguson (AME); 12 Jul 64, 2♂, La Fontaine (CNC); 13 Jul 64, 3♂, La Fontaine (CNC); 14 Jul 64, 5♂, La Fontaine (CNC). *Russell County:* Mer Bleue, 27 Jul 35, 1♀, T.N. Freeman (CNC). *Victoria County:* Bobcaygeon, 6 Jul 31, 9♂ 2♀, J. McDunnough (CNC); 7 Jul 31, 3♂ 1♀, J. McDunnough (CNC); 8 Jul 31, 1♀, J. McDunnough (CNC); 9 Jul 31, 1♀, J. McDunnough (CNC); 12 Jul 31, 3♂ 1♀, J. McDunnough (CNC); 14 Jul 31, 1♂, J. McDunnough (CNC); 5 Jul 32, 1♂, J. McDunnough (CNC); 16 Jul 32, 4♂, J. McDunnough (CNC); 20 Jul 32, 1♂, J. McDunnough (CNC); 21 Jul 32, 1♂ 1♀, J. McDunnough (CNC); 23 Jul 32, 2♂, J. McDunnough (CNC); 26 Jul 32, 1♂ 1♀, J. McDunnough (CNC); 27 Jul 32, 1♀, J. McDunnough (CNC); 29 Jul 32, 1♂ 1♀, J. McDunnough (CNC); 30 Jul 32, 3♂, J. McDunnough (CNC); 1 Aug 32, 1♀, J. McDunnough (CNC). *Wentworth County:* Ancaster, 30 Jun 55, 2♂, J.E.H. Martin (CNC). Hamilton, no date, 2♂, J. Johnston (CNC). *York County:* Kettleby, Jul 49, 1♀ (CM).

QUEBEC.—1♂. *Gatineau County:* Dunlop Road, Gatineau Park, 5 Jul 52, 1♂, F.H. Rindge (AMNH).

UNITED STATES.—706♂ 340♀ $N = 1046$.

ALABAMA.—1♀. *Mobile County:* Spring Hill, 25 Aug, 1♀ (AMNH).

ARKANSAS.—13♂ 5♀. *Faulkner County:* Hope Hill Farm, near Enders, 28 Jul 43, 2♂, H.A. Freeman (USNM); 2 Jun 64, 1♂, H.A. Freeman (USNM). *Hempstead County:* Hope, 10 Aug, 1♀ (AMNH); 18 Aug, 1♂ (AMNH). *Polk County:* 3 km S Grannis, 22 Aug 65, 1♂, G.F. Hevel (USNM). *Washington County:* Blue Springs Campground, south arm Beaver Lake, 29 May 72, 1♂ 1♀, J.R. Heitzman. 8 km S Fayetteville, near Greenland, 11 Sep 66, 1♀, J.R. Heitzman; 3 Sep 67, 2♂ 1♀, J.R. Heitzman. 7.6 km S Fayetteville, along West Fork White River, 400 m, 29 May 74, 1♂, J.R. Heitzman. 8 km S Fayetteville, 1.6 km E airport on West Fork White River, 7 Jul 68, 1♂, J.R. Heitzman; 1 Sep 68, 1♀, J.R. Heitzman; 24 Aug 69, 1♂, J.R. Heitzman. Lake Wedington Park, W Fayetteville, 29 May 66, 1♂, J.R. Heitzman; 29 Aug 66, 1♂, J.R. Heitzman.

CONNECTICUT.—45♂ 26♀. *Fairfield County:* 13 Jul 07, 1♂ (AMNH). Greenwich, 27 Jun 03, 1♂, W.C. Wood (AMNH); 1 Jul 62, 1♂, L.J. Sanford (AMNH); 4 Jul 62, 1♂, L.J. Sanford (AMNH). *Litchfield County:* Long Mountain, New Milford, 12 Jul, 1♀ (AMNH); 14 Jul, 2♂ 1♀ (AMNH); 15 Jul, 1♂ (AMNH); 17 Jul, 1♀ (AMNH). Sharon, 21 Jul 40, 2♂, L.J. Sanford (AMNH); 22 Jul 40, 1♂, L.J. Sanford (AMNH). Washington, 3 Jul 61, 1♂, J.H. Hessel (AMNH); 9 Jul 61, 1♂, J.H. Hessel (AMNH); 21 Jul 61, 1♀, J.H. Hessel (AMNH); 6.4 km N, 19 Jul 62, 4♀, J.M. Burns (USNM). *Middlesex County:* Durham, 14 Jul 62, 1♂ 1♀, J.M. Burns (USNM). Higby Mountain, 8 km WSW Middletown, 10 Jul 62, 10♂ 3♀, J.M. Burns (USNM); 16 Jul 63, 5♂ 1♀, J.M. Burns and D.W. Hottenstein (USNM). Middletown, 26 Jul 62, 2♀, J.M. Burns (USNM); 30 Jul 62, 1♂, J.M. Burns (USNM); 9 Jul 63, 1♂, J.M. Burns and D.W. Hottenstein (USNM). Old Saybrook, 14 Jul 65, 1♂ 1♀, D.C. Ferguson (AME). Portland, 7 Jul 64, 1♂ 1♀, J.M. Burns (USNM). Rockfall, 17 Jul 62, 1♂, J.M. Burns (USNM); 25 Jun 64, 1♂, J.M. Burns (USNM). *New Haven County:* Black Pond, 4.8 km E Meriden, 2 Aug 62, 5♂ 3♀, J.M. Burns (USNM). Quinnipiac River marshes, Hamden, 19 Jul 62, 1♂, J.M. Burns (USNM). 3.2 km E Seymour, 19 Jul 62, 2♂ 1♀, J.M. Burns (USNM). West Rock, New Haven, 3 Jul 61, 1♀, J.H. Hessel (AMNH). *New London County:* South Lyme, 16 Jul 66, 1♂, M. and E. Roshore. *Windham County:* Putnam, 21–31 Jul 50, 2♂ 2♀, A.B. Klots (AMNH); 27 Jul 50, 1♀, A.B. Klots (AMNH); 28 Jul 50, 1♀, A.B. Klots (AMNH).

DELAWARE.—4♂ 2♀. *New Castle County:* Newark, 5 Jul 62, 3♂, J.M. Burns (USNM). Wilmington, 22 Jun 1895, 1♀, F.M. Jones (USNM); 22 Jul 05, 1♀, F.M. Jones (USNM). *Sussex County:* no date, 1♂, F.M. Jones (USNM).

DISTRICT OF COLUMBIA.—8♂ 1♀. No further

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data, 2♂ 1♀ (USNM). Brookland, 17 Jun, 1♂ (AMNH). Rock Creek Park, 23 Jun 78, 2♂, J.H. Fales (USNM); 15 Aug 78, 2♂, J.H. Fales (USNM). Washington, 29 Jul 28, 1♂ (USNM).

FLORIDA.—16♂ 5♀. *Alachua County:* Gainesville, 26 Sep–2 Oct 14, 1♂ (AMNH); 24 May 35, 1♂, T.H. Hubbell (UMMZ). *Duval County:* Jacksonville, 12 Feb 21, 1♀ (AMNH); no date, 1♀ (USNM). *Jefferson County:* Monticello, 4–8 Oct 14, 1♂ (AMNH). *Orange County:* Ocoee, 3 Oct, 1♂ (CM). *Pasco County:* Dade City, Sep 07, 1♂, G. Dorner (USNM); Sep, 1♂ (USNM). *Volusia County:* New Smyrna Beach, 19 Sep 59, 1♂, G.W. Rawson (UL); 13 Jun 69, 2♂, G.W. Rawson (USNM); 17 Oct 73, 1♂, G.W. Rawson (UL). *County undetermined:* "Fla.," no date, 3♂ 1♀ (USNM). "Florida," no date, 1♂ 2♀ (BMNH). Indian River, no date, 2♂ (USNM).

GEORGIA.—24♂ 6♀. *Baldwin County:* Milledgeville, 2 Aug 1894, 1♂, F.M. Jones (USNM). *Camden County:* 17 Aug 49, 1♂ (USNM). *Chatham County:* Savannah, 20–24 May 55, 4♂ 1♀, E.P. Mellon (CM); 16 km N, 23 May 54, 1♂, J. Bauer (CM); 24 May 54, 1♂, J. Bauer (CM). *Fannin County:* Coopers Creek Recreation Area, 7 Aug 65, 2♂, J.C. Symmes. *Fulton County:* near Chattahoochee River, off Harris Trail, 13 Aug 60, 1♀, J.C. Symmes. *Fulton and De Kalb counties:* Atlanta, 23 Jun 40, 1♂, J.C. Symmes; 10 Jul 44, 1♂ 1♀, J.C. Symmes; 5 Aug 45, 2♂, J.C. Symmes. *Harris County:* Pine Mountain, 6 Jun 60, 1♂, J.C. Symmes. *Jasper County:* Monticello, 25 Jul 41, 1♂, P.W. Fattig (USNM). *Rabun County:* 3 Sep 52, 1♂; Dicks Creek, near La Prades Camp, 18 Aug 65, 4♂, L. Harris III. Dicks Creek Road, Lake Burton, near fish hatchery, 18 Aug 65, 1♀, L. Harris III; 19 Aug 65, 2♂, L. Harris III. Dicks Creek Road, near La Prades, 18 Aug 65, 1♀, L. Harris III. *Thomas County:* Greenwood Plantation, Thomasville, 17 May 54, 1♀, E.V. Komarek; 18 May 54, 1♂, L. Harris, Jr.

ILLINOIS.—20♂ 11♀. *Adams County:* Quincy, 9 Jul 1899, 1♂, O.C. Poling (MCZ); Jul 00, 1♂, O.C. Poling (MCZ). *Cook County:* Edgebrook, 25 Jul, 1♂, H. Ramstadt (UMMZ). Evanston, 19 Jul 04, 2♂, E. Liljeblad (UMMZ); 19 Jul 07, 1♂, E. Liljeblad (UMMZ). Matteson, 10 Jul 32, 1♂. Oak Park, 1 Jul 49, 1♂, R.H. Leuschner (AME). Palatine Township, 9 Jul 66, 1♂, J.L. Boughner (AME); 5 Aug 67, 1♀, J.L. Boughner (AME); 6 Jul 68, 1♀, J.L. Boughner (AME). Willow Springs, 4 Aug 07, 1♀, E. Liljeblad (UMMZ). *Du Page County:* Downer's Grove Forest Preserve, 3 Jul 58, 1♂ (AME). *Lake County:* Volo Bog, 8 Jul 72, 1♂, L.J. Melton. Waukegan, 17 Jul 49, 1♀, A.K. Wyatt (AME). *Macon County:* Decatur, 3 Aug 19, 4♂ 1♀, A.W. Lindsey (CM); 1 Aug 20, 1♂ 1♀, A.W. Lindsey (AMNH, CM); 16–23 Jul, 3♂ 5♀ (USNM). *Rock Island County:* Rock Island, 3 Aug 07, 1♂ (AMNH).

INDIANA.—45♂ 13♀. *Carroll County:* Burlington, 12 Jul 69, 2♂, E.M. Shull (AMNH). *Kosciusko County:* Camp Mack, Milford, 3 Jul 69, 1♂, E.M. Shull (AMNH); 9 Jul 69, 5♂ 1♀, E.M. Shull (AMNH); 11 Jul 69, 1♂, E.M. Shull (AMNH); 12 Jul 69, 4♂ 2♀, E.M. Shull (AMNH); 13 Jul 69, 1♂, E.M. Shull (AMNH); 14 Jul 69, 1♂, E.M. Shull (AMNH); 22 Jul 69, 1♂, E.M. Shull (AMNH); 29 Jul 69, 1♀, E.M. Shull (AMNH); 30 Jul 69, 1♀, E.M. Shull (AMNH); 1 Aug 69, 1♂ 1♀, E.M. Shull (AMNH); 4 Aug 69, 1♂, E.M. Shull (AMNH); 22 Aug 69, 2♂, E.M. Shull (AMNH); 25 Aug 69, 1♀, E.M. Shull (AMNH). *Lawrence County:* 2 Aug 31, 1♂, Montgomery (UMMZ). *Monroe County:* Bloomington, 7 Aug 76, 1♀, S.R. Kephart (IU). *Parke County:* Turkey Run State Park, 1 Jul 69, 1♂, J.R. Powers (USNM). *Steuben County:* Angola, 8 Jul, 1♂ (AMNH). *Wabash County:* North Manchester, 22 Jul 67, 2♂, E.M. Shull (AMNH); 1 Jul 69, 1♂, E.M. Shull (AMNH); 3 Jul 69, 1♂, E.M. Shull (AMNH); 4 Jul 69, 4♂, E.M. Shull (AMNH); 5 Jul 69, 3♂, E.M. Shull (AMNH); 8 Jul 69, 1♂ 1♀, E.M. Shull (AMNH); 10 Jul 69, 1♂ 1♀, E.M. Shull (AMNH); 12 Jul 69, 1♂, E.M. Shull (AMNH); 16 Jul 69, 2♂ 1♀, E.M. Shull (AMNH); 18 Jul 69, 1♂, E.M. Shull (AMNH); 19 Jul 69, 2♂, E.M. Shull (AMNH); 20 Jul 69, 1♂, E.M. Shull (AMNH); 21 Jul 69, 1♂, E.M. Shull (AMNH); 22 Jul 69, 1♂ 2♀, E.M. Shull (AMNH).

IOWA.—11♂ 4♀. *Johnson County:* Iowa City, 2 Jul 18, 1♂, A.W. Lindsey (CM); 8 Jul 18, 1♂,

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A.W. Lindsey (CM). *Linn County:* Cedar Rapids, 4 Jul 31, 1♂ 1♀, S.L. O'Byrne. *Monona County:* loess hills 4.5 km W Ticonic, 408 m, 3 Jul 80, 2♀, J.M. Burns (USNM). *Plymouth County:* loess hills at north edge Stone State Park, Woodbury County, 411 m, 30 Jun 80, 1♂ 1♀, J.M. Burns (USNM); 1 Jul 80, 1♂, J.M. Burns (USNM). loess hills 7.2 km SE Westfield, 445 m, 1 Jul 80, 1♂, J.M. Burns (USNM). *Polk County:* Des Moines, 4 Aug 29, 1♂ (AME). *Scott County:* Davenport, 7 Aug 26, 1♂ (AMNH). *Woodbury County:* loess hills 6.4 km E Hornick, 396 m, 2 Jul 80, 1♂, J.M. Burns (USNM). Stone State Park, 26 Jun 73, 1♂, S.H. Parker (USNM); 27 Jun 73, 1♂, J.C. Downey (AME).

KANSAS.—11♂ 2♀. *Douglas County:* Baldwin Hill, 3.2 km N Baldwin City, 25 Jul 59, 2♂, W.H. Howe (AMNH); 16 Jul 60, 4♂ 1♀, W.H. Howe (AMNH). 13 km S Lawrence, 8 Jul 53, 1♂, H.V. Daly (AMNH). *Franklin County:* Mears Park, 9.7 km E Ottawa, 24 Jun 61, 1♂, W.H. Howe (AMNH). *Johnson County:* Prairie Village, 23 Jul 59, 1♀, J.R. Heitzman; 14.5 km S, 23 Jul 59, 1♂, C.P. Slater (AMNH). *Osage County:* Osage, no date, 1♂, Stolley (MCZ). *Pottawatomie County:* 11 km W Wamego, Blackjack Creek, 20 Jul 68, 1♂, G.F. Hevel (USNM).

KENTUCKY.—18♂ 8♀. *Barren County:* Glasgow Junction [= Park City], 29–31 Jul 1892, 1♂, H. Garman (UL). *Bullitt County:* Bernheim Forest, 12 Aug 73, 1♀, R.V. Gregg (UL). Mount Washington, 28 Jul 65, 1♂, C.V. Covell, Jr. Shepardsville, 12 Aug 51, 1♂, B.L. Monroe (UL). *Fulton County:* 3.2 km SW Brownsville, 1 Jun 70, 1♂, B.L. Monroe, Jr. (UL). *Jefferson County:* Anchorage, 23 Jun 50, 1♂, B.L. Monroe (UL); 28 Jun 59, 1♂, B.L. Monroe (UL). Louisville, 3 Jul 70, 1♀, C.V. Covell, Jr.; no date, 1♂, B. Nettelroth (USNM). *Meade County:* Muldraugh, 3 Jul 66, 1♂ 1♀, C.V. Covell, Jr. (UL, USNM); 3 Jul 71, 1♂, C.V. Covell, Jr. (AME). near Muldraugh, 3 Jul 71, 3♂, C.V. Covell, Jr. (UL). *Oldham County:* 30 Jun 66, 1♂, S. Rose (UL). Covered Bridge Boy Scout Reservation, 11 Aug 67, 1♂ 1♀, C.V. Covell, Jr. (UL). Horner Bird and Wildlife Sanctuary, near Brownsboro, 24 Jun 65, 1♂ 2♀, C.V. Covell, Jr. (UL, USNM); 24 Jun 67, 2♂, C.V. Covell, Jr. (UL); 24 Jun 67, 1♂, B. MacCoy (UL); 9 Jul 73, 1♀, C.V. Covell, Jr. (UL). *County undetermined:* "Ky," no date, 1♀ (USNM).

LOUISIANA.—5♂. *Rapides Parish:* Alexandria, 28 May 35, 3♂ (AMNH). *Saint Landry Parish:* Opelousas, 26 May 1897, 2♂, G.R. Pilate (CM).

MARYLAND.—20♂ 10♀. *Allegany County:* Green Ridge State Forest, 10 Jul 58, 1♂, W.A. Andersen; 7 jul 77, 1♂, W.A. Andersen. *Baltimore County:* Eklo, 27 Jun 48, 1♂, W.A. Andersen; 18 Jul 48, 1♂, W.A. Andersen; 25 Jul 48, 1♂, W.A. Andersen; 28 Jun 52, 2♂ 1♀, W.A. Andersen; 24 Jul 52, 1♂, W.A. Andersen. Essex, 28 Jun 56, 1♂ 2♀, W.A. Andersen; 3 Jul 58, 1♂, W.A. Andersen. Prettyboy Reservoir, 14 Aug 57, 1♂, W.A. Andersen. *Calvert County:* Breezy Point, 14 Aug 58, 1♂, W.A. Andersen. *Carroll County:* Finksburg, 28 Jun 65, 1♀, W.A. Andersen. *Cecil County:* Cherry Hill, 8 Jul 71, 1♀, W.A. Andersen. *Charles County:* near La Plata, 28 Jul 60, 1♂, R.S. Simmons (USNM). *Garrett County:* N Avilton, 17 Jul 56, 1♂ 2♀, W.A. Andersen. Savage River State Forest, 12 Jul 79, 1♀, W.A. Andersen. *Prince Georges County:* Beltsville, 9 Jul 64, 1♀, W.A. Andersen. *Talbot County:* Barber, 18 Jul 74, 1♂, W.A. Andersen. Oxford, 16 Jul 82, 1♂; 28 Jul 82, 1♀. *Washington County:* Sandy Hook, 23 Jun 77, 1♂, W.A. Andersen. *Worcester County:* Ocean City, 15 Jul 1897, 1♂, F.M. Jones (USNM). Snow Hill, 21 Jul, 2♂ (USNM).

MASSACHUSETTS.—53♂ 26♀. *Barnstable County:* South Harwich, no date, 1♂ (AMNH). West Harwich, 19 Aug 59, 1♀, L.J. Sanford (AMNH). *Dukes County:* Marthas Vineyard, 10 Aug 17, 1♀, F.M. Jones (USNM); 5 Aug 41, 1♂, F.M. Jones (USNM); 29 Jul 46, 1♂, F.M. Jones (AMNH); 21 Jul, 1♀, F.M. Jones (USNM); 24 Jul, 1♂, F.M. Jones (USNM); 25 Jul, 1♂, F.M. Jones (USNM); 28 Jul, 1♂ 1♀, F.M. Jones (USNM); 29 Jul, 1♀, F.M. Jones (AMNH); 1 Aug, 2♂, F.M. Jones (USNM); 4 Aug, 1♀, F.M. Jones (USNM); 7 Aug, 2♀, F.M. Jones (USNM); Aug, 1♀, F.M. Jones (USNM). West Tisbury, Marthas Vineyard, 20 Jul 47, 1♂, D.C. Ferguson (AME). *Essex County:* Manchester, 19 Jul 39, 1♂ 1♀ (AMNH).

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Rowley, 6 Jul, 1♀ (AMNH); 12 Jul, 1♂ (AMNH); 13 Jul, 2♂ (AMNH); 14 Jul, 1♂ (AMNH); 18 Jul, 1♂ (AMNH); 20 Jul, 1♂ (AMNH). Salem, 12 Jul 19, 1♂, F.H. Walker (AMNH). *Franklin County:* Deerfield, 13 Jul 1885, 3♂, F.H. Sprague (MCZ); 18 Jul 1885, 1♂, F.H. Sprague (MCZ). Montague, 12 Jul 1885, 1♀, F.H. Sprague (MCZ); 15 Jul 1885, 1♂ 1♀, F.H. Sprague (MCZ). *Hampden County:* Chester, 6 Aug, 1♂ (MCZ). *Hampshire County:* Amherst, 12 Jul 1886, 1♂, F.H. Sprague (MCZ); 28 Jun 22, 1♂ (USNM). Belchertown, 6 Jul 1878, 1♂ 1♀, F.H. Sprague (MCZ); 8 Jul 1878, 1♂, F.H. Sprague (MCZ); 15 Jul 1878, 1♀, F.H. Sprague (MCZ). Granby, 16 Jul 1885, 1♂, F.H. Sprague (MCZ). Mount Tom, 4 Jul, 1♂ (CM); no date, 1♂ (AMNH). *Middlesex County:* Lexington, 29 Jun 73, 1♀, J.M. Burns (USNM); 2 Jul 73, 1♂, J.M. Burns (USNM); 12 Jul 73, 3♂ 4♀, J.M. Burns (USNM). Malden, 13 Jul 1883, 1♂, F.H. Sprague (MCZ); 27 Jul 1895, 1♂ 1♀, F.H. Sprague (MCZ). Tyngsboro, 22 Jul 14, 1♂ (MCZ). Weston, no date, 2♂ 3♀ (MCZ). *Norfolk County:* Milton, 14 Jul 1895, 2♂, F.H. Sprague (MCZ). Wellesley, 25 Jul 45, 1♂, V. Nabokov (MCZ). Wollaston, 20 Jul 1883, 1♂, F.H. Sprague (MCZ); 25 Jul 1883, 2♂, F.H. Sprague (MCZ); 7 Jul 1885, 1♂, F.H. Sprague (MCZ); 19 Jul 1896, 1♀, F.H. Sprague (MCZ). *Suffolk County:* Jamaica Plain, 18 Jul 1883, 3♂, F.H. Sprague (MCZ). Roxbury, 18 Jul 1883, 1♂, F.H. Sprague (MCZ). West Roxbury, Boston, 18 Jul 1883, 1♂, F.H. Sprague (MCZ). *Worcester County:* 1.6 km W Sturbridge, 11 Jul 69, 1♂ 1♀, J.R. Powers (USNM). *County undetermined:* "Mass.," no date, 1♂ (MCZ).

MICHIGAN.—56♂ 28♀. *Berrien County:* Herbert Dunes, 28 Jul 17, 1♂, W.S. McAlpine (UMMZ); 30 Jul 17, 1♂, W.S. McAlpine (UMMZ); 31 Jul 17, 1♂, W.S. McAlpine (UMMZ); 3 Aug 17, 1♀, W.S. McAlpine (UMMZ); 6 Aug 17, 1♂ 1♀, W.S. McAlpine (UMMZ). Paw Paw Lake, 7 Jul 06, 1♂, E. Liljeblad (UMMZ); 28 Aug 09, 1♀, E. Liljeblad (UMMZ). *Cass County:* Wakelee, 4 Jul 36, 1♂ 1♀, S. Moore (UMMZ); 2 Aug 58, 1♂, L.J. Sanford (AMNH). *Charlevoix County:* Hoffman Lake, 9 Jul 41, 1♂ 1♀, S. Moore (UMMZ). *Genesee County:* Flint, 10 Jul 59, 2♂ (AMNH). *Huron County:* Sand Point, Long Lake, 23 Jul 34, 5♂, F.M. Gaige (UMMZ). *Ingham County:* East Lansing, 21 May 32, 1♂ (USNM). *Kent County:* Lamberton Lake, 9 Jul 30, 1♂, W.W. Newcomb (UMMZ). *Livingston County:* George Reserve, Pinckney, 11 Jul 31, 1♀, T.H. Hubbell (UMMZ); 11 Jul 31, 2♀, S. Moore (UMMZ); 12 Jul 31, 1♂, S. Moore (UMMZ); 1 Jul 33, 1♂, S. Moore (UMMZ); 9 Jul 33, 1♀, G.W. Rawson (USNM); 15 Jul 33, 1♂ 1♀, S. Moore (UMMZ); 1 Jul 34, 2♂ 1♀, S. Moore (UMMZ); 21 Jul 35, 1♂, S. Moore (UMMZ); 7 Jul 42, 2♂, G.W. Rawson (USNM); 27 Jul 46, 1♂, S. Moore (UMMZ). *Midland County:* 9 Jul 44, 1♂, R.R. Dreisbach (USNM). *Muskegon County:* 2 Aug 44, 1♀, R.R. Dreisbach (USNM). *Oakland County:* 4 Jul 30, 1♂, S. Moore (UMMZ). Bloomfield, 1 Jul 28, 1♂, S. Moore (UMMZ); 15 Jul 28, 1♀, S. Moore (UMMZ); 7 Jul 29, 3♂ 2♀, S. Moore (UMMZ); 5 Jul 31, 1♂ 1♀, S. Moore (UMMZ); 3 Jul 32, 1♂, S. Moore (UMMZ); 3 Jul 32, 2♂, G.W. Rawson (USNM). 8 Mile Road, 3 Jul 03, 1♂, W.W. Newcomb (CNC); 5 Jul 05, 1♂, W.W. Newcomb (UMMZ); 20 Jul 07, 1♂, W.W. Newcomb (UMMZ); 5 Jul 10, 1♀, W.W. Newcomb (UMMZ). 12 Mile Road, 9 Jul 05, 1♂, W.W. Newcomb (UMMZ). northeast quarter Section 30, T.2N R.8E, 28 Jun 30, 1♂, W.S. McAlpine (USNM). *Otsego County:* 11.3 km E Vanderbilt, 7 Jul 55, 1♂, F. and P. Rindge (AMNH). *Saginaw County:* Bridgeport, 1 Jul, 1♂ (AMNH). *Saint Clair County:* Port Huron, 12 Jul 28, 1♂, S. Moore (UMMZ); 19 Jul 29, 2♀, S. Moore (UMMZ). *Saint Joseph County:* Three Rivers, 10 Jul, 1♂, Lawler (AMNH). *Washtenaw County:* 27 Jul 30, 1♀, W.C. Stinson (UMMZ). Ann Arbor, 16 Jul 29, 1♂, W.W. Newcomb (UMMZ). Base Lake, 18 Jul 19, 1♀, W.W. Newcomb (UMMZ). Willis, 18 Jul 31, 1♂, W.C. Stinson (UMMZ); 4 Jul 32, 1♀, S. Moore (UMMZ); 17 Jul 32, 1♀, S. Moore (UMMZ); 18 Jul 37, 2♀, S. Moore (UMMZ). *Wayne County:* 13 Jul 30, 1♂, G.W. Rawson (USNM). Detroit, 4 Jul 31, 2♂, S. Moore (UMMZ); Mack Avenue, 4 Jul 32, 2♀, G.W. Rawson (USNM). Grosse Ile, 10 Jul 10, 1♂, W.W. Newcomb (UMMZ). *County undetermined:* "Michigan," 9 Jul 10, 1♂ (USNM); 4 Jul 13, 1♀ (USNM); no date, 4♂ (USNM).

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MINNESOTA.—1♂ 2♀. *Wabasha County:* Dumfries, 23 Jul 69, 1♂, J.R. Powers (USNM). Wabasha, 14 Jul 79, 1♀, J.R. Powers (USNM); 4.8 km W, 23 Jul 69, 1♀, J.R. Powers (USNM).

MISSISSIPPI.—45♂ 13♀. *Adams County:* Natchez, 25 May 69, 1♂ 1♀, B. and K. Mather. *Clay County:* Cedarbluff, 1 Jun, 1♂ (AMNH); 2 Aug, 1♂ (AMNH); 8 Aug, 1♂ (AMNH); 13 Aug, 1♂ (AMNH). *Forrest County:* Shelby State Park, 29 Apr 61, 1♂, B. and K. Mather. *Hinds County:* Bolton, 12 Jun 60, 1♀, B. and K. Mather; 12 Jun 60, 3♂, M. and E. Roshore. Brownsville, 24 Aug 57, 1♀, B. and K. Mather; 30 May 58, 1♂ 1♀, B. and K. Mather; 1 Jun 58, 1♂, B. and K. Mather (AMNH); 1 Jun 58, 2♂, M. and E. Roshore. Clinton, 30 May 51, 1♂, B. and K. Mather; 8 Jun 58, 1♂ 1♀, B. and K. Mather; 15 Jun 58, 1♂, B. and K. Mather; 7 Jun 59, 1♂, B. and K. Mather; 7 Jun 59, 1♀, M. and E. Roshore; 11 Oct 59, 1♂, M. and E. Roshore; 4 Jun 60, 1♂, M. and E. Roshore; 12 Jun 60, 1♂, B. and K. Mather; 12 Jun 60, 1♂, M. and E. Roshore; 28 May 61, 1♂ 1♀, M. and E. Roshore; 10 Jun 62, 3♀, B. and K. Mather. Jackson, 8 Jun 68, 1♂, B. and K. Mather. *Lowndes County:* Columbus, 21 May 66, 1♂, M. Fulton (AMNH). *Madison County:* Natchez Trace, 6 Jun 54, 7♂ 2♀, B. and K. Mather. *Oktibbeha County:* Dorman Lake, 9 km SE Longview, 30 May 73, 2♂, C.T. Bryson (AMNH); 31 May 73, 5♂, C.T. Bryson (AMNH); 14 Jun 73, 2♂, C.T. Bryson (AMNH); 30 Aug 73, 1♂, C.T. Bryson (AMNH); 24 May 74, 1♂, C.T. Bryson (AMNH). *Simpson County:* Ina, 29 May 60, 1♂, B. and K. Mather. *Warren County:* Bovina, 27 May 67, 1♂ 1♀, M. and E. Roshore. *Webster County:* Cumberland, 26 Jun 73, 1♂, C.T. Bryson (AMNH).

MISSOURI.—29♂ 18♀. *Benton County:* 4.8 km NW Warsaw on state route UU, 14 Jul 74, 2♂ 2♀, J.R. Heitzman; 20 Jul 74, 2♀, J.R. Heitzman; 4 Jul 77, 1♂, J.R. Heitzman. 6.4 km NW Warsaw on state route UU, 15 Jul 73, 1♂, J.R. Heitzman. *Camden County:* Camdenton, 16 Jul 61, 1♂, J.R. Heitzman. *Carter County:* Van Buren, Ozark Mountains, 2 Jul 30, 1♂, E.A. Pence (UMMZ). *Douglas County:* Noblett Lake Road, S Willow Springs, 24 Jul 79, 1♂, D. Hess. *Franklin County:* Meramec State Park, 18 Aug 73, 1♂ 2♀, J.R. Heitzman; 19 Aug 73, 1♂ 1♀, J.R. Heitzman. *Greene County:* Willard, 10 Jul, 1♂, A.E. Brower (AMNH); 11 Jul, 2♂ (AMNH). *Hickory County:* Hermitage, 9 Jul 60, 1♂, W.H. Howe (AMNH). *Jackson County:* Independence, 12 Jul 58, 1♂, J.R. Heitzman (AMNH); 2 Aug 58, 1♂, J.R. Heitzman; 24 Jul 59, 1♀, J.R. Heitzman; 19 Jul 60, 1♂ 1♀, J.R. Heitzman. Lee's Summit, 17 Jul 62, 1♀, J.R. Heitzman. *Jefferson County:* Cedar Hill, 6 Jun 26, 1♂, H.I. O'Byrne. *Laclede County:* near Bennett Springs, 9 Jul 60, 1♂, J.R. Heitzman. *Pike County:* Louisiana, 27 Jul 12, 1♀ (AMNH); 28 Jul 12, 1♀ (AMNH); 29 Jul 12, 1♂ (AMNH); 28 Jul, 1♂ 1♀ (AMNH). *Saint Clair County:* Osceola, 13 Jul 64, 1♂, J.R. Heitzman. *Sainte Genevieve County:* Hawn State Park, 17 Jun 78, 1♀, J.R. Heitzman; 26 Jul 78, 1♂, J.R. Heitzman. *Saint Louis city:* 1 Aug 08, 1♂ (BMNH); Jul 12, 1♂ (BMNH); 15 Jul 34, 1♀, E.P. Meiners. *Saint Louis County:* 16 Jul 78, 1♀, L. Robinson. Big Bend and Sulfur Springs [roads], 10 Jun 78, 2♂, L. Robinson. Cliff Cave, Jun 28, 1♀. Jennings, no date, 1♂ (AMNH). Ranken, 23 Jul 33, 1♂, E.P. Meiners. *Taney County:* Hollister, 28 Jul 29, 1♂ (AMNH). *County undetermined:* "Missouri," May, 1♀ (USNM).

NEBRASKA.—7♂ 6♀. *Douglas County:* Omaha, 26 Jul 08, 1♀, R.A. Leussler (USNM); 31 Jul 10, 1♂, R.A. Leussler (USNM); 6 Aug 24, 4♂ 3♀, R.A. Leussler (AMNH); 9 Aug 24, 2♀, R.A. Leussler (AMNH); 17 Jul 25, 1♂, R.A. Leussler (AMNH). *County undetermined:* "Neb.," no date, 1♂ (USNM).

NEW HAMPSHIRE.—1♂. *Rockingham County:* Portsmouth, Jul, 1♂ (USNM).

NEW JERSEY.—39♂ 45♀. *Bergen County:* Palisades, 11 Jul 20, 1♂ (AMNH). Ramapo Mountains, Bear Swamp, 9–17 Jul 10, 1♂, C.L. Pollard (USNM). Ramsey, 7 Jul 34, 1♂ 1♀, W.J. Gertsch (AMNH). *Cape May County:* Anglesea, 21 Aug, 3♂ 3♀ (AMNH); Sep, 1♂ (AMNH). *Essex County:* Montclair, 4 Jul 1899, 1♂, W.D. Kearfott (USNM). Newark, 25 Jun, 1♂ (USNM). Verona, no date, 1♂ (USNM). *Gloucester or Salem County:*

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Harrisonville, 24 Jul 62, 1♂, J.H. Hessel (AMNH). *Middlesex County:* Jamesburg, 1 Jul 03, 1♀ (AMNH); 11 Aug 07, 1♂ (AMNH); 27 Jun, 1♀, C.L. Pollard (USNM). *Morris County:* 3 Jul 37, 1♀, 0. Buchholz (AMNH); 4 Aug 40, 1♀, 0. Buchholz (AMNH). Mendham, 26 Jun 32, 1♂, C.F. dos Passos (AMNH); 3 Jul 32, 1♂, C.F. dos Passos (AMNH); 9 Jul 32, 1♀, C.F. dos Passos (AMNH). *Ocean County:* 23 Jul 39, 2♂, 0. Buchholz (AMNH); 20 Jul 41, 1♀, 0. Buchholz (AMNH). Lakehurst, 26 Jul 32, 1♀, C.F. dos Passos (AMNH); 28 Jul 35, 2♀ (USNM); 26 Jul 36, 1♂ (USNM); 23 Jun 77, 2♂, W.B. Wright (USNM). *Passaic County:* Mountain View, 10 Jul 38, 1♂ 1♀, A. Nicolay (AMNH); 16 Jul 38, 1♀, A. Nicolay (AMNH). Oak Ridge, 3 Jul 04, 1♂ (USNM). *Somerset County:* Voorhees, 22 Jun 18, 2♂ 1♀, E.L. Bell (AMNH). *Sussex County:* 11 Jul 37, 2♀, 0. Buchholz (AMNH); 4 Jul 38, 1♂, 0. Buchholz (AMNH); 9 Jul 39, 1♀, 0. Buchholz (AMNH); 1 Jul 43, 2♀, 0. Buchholz (AMNH). Ogdensburg, 9 Jul, 1♂ (AMNH); 10 Jul, 2♀ (AMNH); 11 Jul, 2♀ (AMNH). Stockholm, 8 Jul, 1♀ (AMNH). *Sussex or Morris County:* Lake Hopatcong, 29 Jun 13, 1♂ (AMNH). *Union County:* Elizabeth, 2 Jul 1899, 2♀ (MCZ); 5 Jul 1899, 1♂ (USNM); 26 Jun, 1♂ (USNM); 1 Jul, 1♀ (AMNH); 4 Jul, 2♂ (USNM); 5 Jul, 1♂ (USNM); 9 Jul, 1♂ 2♀ (AMNH, USNM); 19 Jul, 1♀ (AMNH). *County undetermined:* Holly Beach, 6 Aug 03, 1♀, F. Haimbach (USNM). Orange Mountains, 26 Jun 37, 2♂, 0. Buchholz (AMNH); 17 Jun, 3♂ (AMNH); 24 Jun, 2♂ 1♀ (AMNH, USNM); 1 Jul, 2♀ (AMNH, USNM); 4 Jul, 3♀ (AMNH); 7 Jul, 2♀ (USNM); 16 Jul, 1♀ (USNM); 2 Aug, 3♀ (AMNH, USNM).

NEW YORK.—72♂ 34♀. *Albany County:* Albany, 4 Jul 27, 1♀, A.C. Frederick (AMNH); 18 Jul 35, 1♂, A.C. Frederick (AMNH); 18 Jul 36, 1♂, A.C. Frederick (AMNH); 3 Jul 37, 1♂, A.C. Frederick (AMNH); 22 Jul 38, 1♂ (AME); 9 Jul 39, 1♂, A.C. Frederick (AMNH); 3 Jul 44, 1♂, A.C. Frederick (AMNH); 7 Jul 46, 1♂, A.C. Frederick (AMNH). Karner, 10 Jul 08, 2♂ (AMNH); 10 Jul 09, 1♂ (AMNH). *Bronx County:* West Farms, New York City, 2 Jul 1870, 1♂ (AMNH). *Cattaraugus County:* Allegany State Park, 20 Jul 29, 1♀ (USNM). *Greene County:* Stony Clove, Catskill Mountains, 5 Jul 10, 1♂ (AMNH); 6 Jul 10, 2♂, F.E. Watson (AMNH); 1 Jul 11, 1♂, F.E. Watson (AMNH); 3 Jul 11, 1♂ 1♀, F.E. Watson (AMNH); 8 Jul 11, 1♂ 1♀, F.E. Watson (AMNH); 10 Jul 11, 1♂, F.E. Watson (AMNH); 13 Jul 11, 1♀, F.E. Watson (AMNH). *Monroe County:* 6 Jul 46, 1♂, C.P. Kimball (AMNH); 16 Jul 46, 2♀, C.P. Kimball (AMNH, CNC). Rochester, no date, 1♂, F. Teute (USNM). *Nassau County:* Central Park, 27 Jul 24, 1♂, L.B. Woodruff (AMNH). *Niagara County:* Lewiston, 8 Jul 04, 2♂ (AMNH); 14 Jul 05, 1♂ 1♀ (AMNH). *Oneida County:* Westernville, 18 Jul 29, 1♂, W.C. Wood (AMNH). *Orange County:* no date, 1♂ (CM). Tuxedo, 8 Jul 35, 2♀, W.J. Gertsch (AMNH). *Otsego County:* Springfield Center, 22 Jul 63, 1♀, C.V. Covell, Jr. *Queens County:* 15 Jul 05, 2♂ 1♀ (AMNH). Flushing, 28 Jun, 5♂ 1♀, E.L. Bell (AMNH); 30 Jun, 1♂ (AMNH); 2 Jul, 2♂ (CM); 5 Jul, 1♂, E.L. Bell (AMNH); 6 Jul, 1♂ 2♀, E.L. Bell (AMNH); 12 Jul, 3♀, E.L. Bell (AMNH). Jamaica, 18 Jun, 1♂ (AMNH); 25 Jun, 4♂ (AMNH); 2 Jul, 1♂ 2♀ (AMNH). *Richmond County:* Pleasant Valley, Staten Island, 22 Jul 27, 1♀ (AMNH). Staten Island, 9 Jul 32, 3♂, A.S. Pinkus (AMNH). *Rockland County:* Suffern, 21 Jul 17, 1♀ (AMNH). *Schoharie County:* 29 Jul 28, 1♀, A.C. Frederick (AMNH). *Suffolk County:* Gardiners Island, 18 Jul 18, 1♀ (AMNH). Kalbfleisch Field Research Station, Huntington, 13 Jul 61, 1♂ 1♀, D. Gill (AMNH); 28 Jun 64, 1♂ (AMNH). Oakdale, 4 Jul, 3♂ 2♀ (AMNH, CM); 10 Jul, 1♀ (AMNH). Riverhead, 19 May 52, 1♂, R. Latham (AMNH). *Tompkins County:* Ithaca, 12 Jul 20, 1♂ (USNM). *Westchester County:* Bedford, 3 Jul 35, 1♂, R.B. Dominick (AMNH); 11 Jul 35, 1♂, R.B. Dominick (AMNH); 5 Jul 37, 1♂, R.B. Dominick (AMNH); 18 Jul 37, 1♀, R.B. Dominick (AMNH); 11 Jul 39, 1♂, R.B. Dominick (AMNH). Mount Kisco, 24 Jul, 1♂ (AMNH). Northcastle, 2 Jul 35, 3♂, R.B. Dominick (AMNH); 5 Jul 36, 1♂, R.B. Dominick (AMNH); 2 Jul 38, 1♂, R.B. Dominick (AMNH); 18 Jul 40, 1♂, R.B. Dominick (AMNH). Somers, 26 Jun 22, 1♂ 1♀, W.C. Wood

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(AMNH); 2 Jul 22, 1♂, W.C. Wood (AMNH); 11 Jul 24, 1♂, W.C. Wood (AMNH); 27 Jun 25, 1♂, W.C. Wood (AMNH); 2 Aug 26, 1♂, W.C. Wood (AMNH). *County undetermined:* Bear Mountain, 5 Jul 34, 1♀ (USNM); 11 Jul 34, 1♂ 1♀ (USNM). Helderberg Mountains, 13 Jul 29, 1♂, A.C. Frederick (AMNH). Lake Charlotte, 15 Jul 18, 1♀ (AMNH). Summit, 10 Jul, 1♀ (AMNH).

NORTH CAROLINA.—4♂ 2♀. *Brunswick County:* Leland, 26 Jun 39, 2♂, O. Buchholz (AMNH). *Gaston County:* Gastonia, 8 Aug 39, 1♀, R.M. McKenzie (AMNH). *Transylvania County:* Connestee Falls, near Brevard, 1–7 Jul, 1♂ (CM). *Wake County:* Raleigh, 18 Aug 02, 1♀ (USNM). *Yancey County:* Micaville, 23 Jun 57, 1♂, J.C. Symmes.

OHIO.—21♂ 7♀. *Columbiana County:* Millport, 4 Jul 27, 2♂ (CM). *Franklin County:* Columbus, no date, 5♂ (MCZ, USNM). *Hamilton County:* Cincinnati, 3 Jul 37, 2♂ (AME); 4 Jul 37, 1♂ 1♀ (AME); 25 Jul 37, 1♂ (AME); 7 Aug 37, 1♀ (AME). *Seneca County:* Fostoria, 3 Jul 08, 1♂, D.F. Berrenger (CNC); 10 Jul 08, 1♂ 1♀, D.F. Berrenger (CNC). *Stark County:* Waynesburg, 1 Jul 29, 1♂ 1♀, C.W. Baker (BMNH); 7 Jul 29, 7♂ 3♀, C.W. Baker (BMNH).

OKLAHOMA.—2♂ 1♀. *Tulsa County:* Bixby, 4 Sep 76, 1♀, J.M. Nelson; 17 May 77, 1♂, J.M. Nelson. *Wagoner County:* Lake Bixhoma, 7 Jun 78, 1♂, J.M. Nelson.

PENNSYLVANIA.—12♂ 7♀. *Allegheny County:* Aspinwall, 8 Jul 28, 1♀, Chermock (USNM). Oak Station, 5 Jul 03, 1♂, F. Marloff (CM). Pittsburgh, 2 Jul, 1♂ (CM). Sharpsburg, 10 Jul 27, 1♂, Sweadner (CM); 15–21 Jul, 1♀ (CM). *Beaver County:* 17 Jun, 1♀, H. Engel (CM). New Brighton, 22 Jun 11, 1♂ (USNM). *Berks County:* Reading, 2 Jul 35, 1♂ (AME); 4 Jul 60, 1♂, Smaglinski (AMNH). Wernersville, 09, 1♀, F.M. Jones (USNM). *Bucks County:* Ferndale, 2 Jul 74, 1♂, F.D. Fee (USNM). *Centre County:* 18 Jul 71, 1♂, D. Wagner (AMNH). *Chester County:* Nottingham, 22 Jun 29, 1♂, F.M. Jones (USNM). *Erie County:* East Millcreek-East Gore Road, 17 Jul 80, 1♂, J. Prescott (USNM). *Fayette County:* 11.3 km SE Champion, 4 Jul 69, 1♂, J.R. Powers (USNM). *Lancaster County:* Penryn, 17 Jul 66, 1♀, M. and E. Roshore. *Washington County:* Charleroi, Jun 00, 1♂ (CM). Finleyville, 16 Jul, 2♀, H. Engel (AME).

RHODE ISLAND.—5♂. *Providence County:* Oak Lawn, 14, 1♂ (AMNH). *Washington County:* Matunuck, 23 Jul 70, 2♂, G.S. Anthony (AMNH). West Kingston, 18 Jul 58, 1♂, L.J. Sanford (AMNH); 21 Jul 58, 1♂, L.J. Sanford (AMNH).

SOUTH CAROLINA.—4♂ 7♀. *Charleston County:* 16 km NE Charleston, 29 May 74, 1♂, R.B. Dominick. *Edgefield County:* Sleepy Creek, Aug 54, 1♂ 1♀, E.P. Mellon II (CM). *Georgetown County:* Plantersville, 25 Aug 74, 2♂ 4♀, J.M. and S.N. Burns (USNM). *Pickens County:* 9.7 km N Pickens, 28 Aug 71, 2♀, B.J. Smith.

SOUTH DAKOTA.—1♂. *Brookings County:* Volga, no date, 1♂ (USNM).

TENNESSEE.—5♂ 5♀. *Davidson County:* Nashville, 26 Jun 1895, 1♀ (BMNH). *Grundy County:* Monteagle, 28 Jun 30, 1♂, Richards (AMNH); 6 Jul 30, 1♀, Richards (AMNH); 16 Jul 30, 1♀, Richards (AMNH); 21 Aug 30, 1♂, Richards (AMNH). *Monroe County:* Tellico Plains, 14 Jun 65, 1♀, J.C. Symmes. *Robertson County:* 48 km N Nashville, 15 Jul 34, 2♂, W.J. Gertsch (AMNH). *Sevier County:* Elkmont Road, Great Smoky Mountains National Park, 10 Aug 42, 1♀. *Sullivan County:* 16 km S Kingsport, 16 Jun 79, 1♂, J.A. Hyatt (USNM).

TEXAS.—27♂ 16♀. *Angelina County:* Diboll, 21 Sep 73, 2♂, W.W. McGuire (USNM). *Blanco County:* no date, 2♂ (USNM). *Blanco and Burnet counties:* Shovel Mountain, no date, 1♂ 1♀ (BMNH). *Dallas County:* Lancaster, 2 May 40, 1♂ (AMNH). *Hardin County:* Honey Island, 3 Jun 73, 1♂, M.A. Rickard; 25 May 74, 1♂, W.W. McGuire (USNM). *Harris County:* Houston, 27 Sep 66, 1♂ 5♀, M.A. Rickard; 15 Sep 67, 1♂ 1♀, M.A. Rickard; 13 Sep 72, 2♂, M.A. Rickard; 4 Jun 73, 1♂, M.A. Rickard; 15 Sep 73, 1♂, M.A. Rickard; 15 May 74, 1♂, M.A. Rickard; 28 Sep 74, 2♀, M.A. Rickard. Houston Memorial Park, 29 May 73, 2♂, F.R. Hedges. Lake Houston, 9 Sep 72, 2♂ 2♀, F.R. Hedges; 15 Sep 73, 1♂ 2♀, F.R. Hedges. *Jasper County:* U.S. route 190, 4 Sep 66, 2♂, R.O. Kendall. *Liberty County:* Cleveland, 6 Sep 71, 2♂, M.A. Rickard. *Montgomery County:* near Spring, 13 Sep 66, 2♂, M.A. Rick-

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ard. *Polk County:* Corrigan, 18 Sep 71, 2♀, M.A. Rickard. *Smith County:* Tyler State Park, 10 Jun 68, 1♀, J.R. Heitzman. *Walker County:* Huntsville, 12 Sep 71, 1♂, M.A. Rickard.

VERMONT.—1♂ 1♀. *Addison County:* Lake Dunmore, date unintelligible, 1♀, A. Loveridge (UMMZ). *Chittenden County:* Charlotte, 3 Jul 62, 1♂, J.H. Hessel (AMNH).

VIRGINIA.—54♂ 17♀. *Arlington County:* Glencarlyn, 18 Jun 38, 1♀, A. Nicolay (AMNH); 12 Aug, 1♀, A.N. Caudell (USNM). *Bath County:* 16 km N Clifton Forge, 30 Jul 79, 1♂ 1♀, P.A. Opler (USNM). *Buckingham County:* 11 Aug 27, 1♀, W.T. Davis (AMNH). *Chesapeake city (formerly the bulk of Norfolk County) and Virginia Beach city (formerly Princess Anne County):* North Landing River, 4 Sep 36, 1♂, A.H. Clark (USNM). *Craig County:* Johns Creek Valley, SW Maggie, 580 m, 22 Jul 65, 1♀, J.M. Burns (USNM). *Fairfax County:* Difficult Run, 22 Jun 35, 1♂ (USNM). New Alexandria, 18 Jun, 2♀ (AMNH). *Giles County:* Kimballton, Big Stony Creek Valley, 520 m, 30 Jul 65, 2♂, J.M. Burns (USNM). Kire, Big Stony Creek Valley, 790 m, 5 Aug 65, 1♂, J.M. Burns (USNM). Pembroke, 500 m, 2 Jul 65, 2♂, J.M. Burns (USNM); 16 Jul 65, 1♂, J.M. Burns (USNM); 2.4 km S, 500 m, 12 Jul 65, 1♀, R.R. Stewart (USNM). lower slopes Potts Mountain, SE Kire, 880 m, 5 Aug 65, 1♀, J.M. Burns (USNM). Salt Pond Mountain, below Mountain Lake, 915 m, 13 Jul 65, 1♀, J.M. Burns (USNM); 880 m, 16 Jul 65, 2♂, J.M. Burns (USNM). Sinking Creek Valley, 11.3 km E Pembroke, 550 m, 25 Jun 65, 1♂, J.M. Burns (USNM); 12 Jul 65, 1♂, J.M. Burns (USNM); 20 Jul 65, 4♂, J.M. Burns (USNM); 24 Jul 65, 6♂, J.M. Burns (USNM); 11 Aug 65, 1♂, J.M. Burns (USNM). White Pine Lodge, Little Stony Creek Valley, near Mountain Lake, 15 Jul 53, 1♂, J.M. Burns (USNM). *Grayson, Smyth, and Washington counties:* Whitetop Mountain, 11 Jul 36, 1♂ (USNM). *Isle of Wight County:* Smithfield, 27 Jul 38, 6♂ 1♀, O. Buchholz (AMNH). *King William County:* Aylett, 18 Jul 37, 1♂ (USNM). *Lee County:* Dot, 2 Aug 40, 1♂, A.H. Clark (USNM). *Montgomery County:* 8 Aug 1898, 1♂ 2♀ (USNM); 20 Jun 1899, 1♂ (USNM); 2 Jul 00, 1♀ (USNM); no date, 4♂ (USNM). Blacksburg, 25 Jul 33, 1♂ 1♀, H.J. Erb (AMNH); no date, 1♂ (USNM). Poverty Hollow, 29 Jun 60, 1♂, C.V. Covell, Jr.; 24 Jul 62, 2♂, C.V. Covell, Jr. Prices Fork, 13 Jul 60, 1♂, C.V. Covell, Jr. (AME). *Nelson County:* Wingina, 8 Aug 24, 1♂, W.T. Davis (AMNH). *Northampton County:* Bayford, 27 Jul 35, 1♂ (USNM). *Shenandoah County:* Hamburg, 23 Jul 41, 2♂, A.H. Clark (USNM). *Suffolk city (formerly Nansemond County):* Dismal Swamp, near Suffolk, 14 Jun 38, 2♂, Mrs. E.L. Bell (AMNH). Suffolk, 23 Jul 25, 1♂ (USNM). *Washington County:* Abingdon, 20 Jul 59, 1♀, M. and E. Roshore (AMNH). Holston, 5 Aug 38, 1♂, A.H. Clark (USNM); 5 Aug 40, 1♀, A.H. Clark (USNM).

WEST VIRGINIA.—18♂ 5♀. *Braxton County:* 30 Jun 76, 1♂, B. Drees (WVU). *Hampshire County:* "Caudy Castle" [ca. 2.4 km S Forks of Cacapon], 21 Jun 42, 1♂ 1♀, W.H. Wagner (USNM). Forks of Cacapon, 11 Jul 80, 2♂, J.M. and S.N. Burns (USNM). *Kanawha County:* Cabin Creek, 24 Aug 07, 1♂ (AMNH). Charleston, 24 Jun 00, 1♂ (USNM). Coalburg, 17 Aug 07, 2♀ (AMNH); 21 Aug 07, 1♂ (AMNH); 21 Aug 08, 1♂ (AMNH). *Mineral County:* New Creek, 25 Jun 76, 2♂, J. Amrine (WVU). *Monongalia County:* Arboretum, 11 Jul 76, 1♂, J. Amrine (WVU). Morgantown, 21 Jun, 1♂ (WVU). *Pendleton County:* 6.4 km NE Sugar Grove, 15 Jul 79, 1♂ 1♀, P.A. Opler (USNM). *Preston County:* Fellowsville, 19 Jul 66, 2♂, M. and E. Roshore. *Randolph County:* 6.4 km NW Spruce Knob Lake, 11 Jul 83, 1♂, P.A. Opler (USNM). *Upshur County:* Holly Grove, 22–31 Aug, 2♂ 1♀ (CM).

WISCONSIN.—9♂ 6♀. *Brown County:* 18 Jul 47, 1♂ (AMNH); 19 Jul 47, 1♂ (AMNH). *Florence County:* near Bass Lake, 14 Jul 76, 1♀, R.A. Rahn (USNM). *Marathon County:* Norrie township, 7 Jul 75, 1♂, R.A. Rahn (USNM); 17 Jul 76, 1♂ 2♀, R.A. Rahn (USNM); 2 Jul 77, 1♂, R.A. Rahn (USNM). Rib Mountain township, 15 Jul 78, 1♀, R.A. Rahn (USNM); 17 Jul 79, 3♂ 1♀, R.A. Rahn (USNM). *Waukesha County:* Oconomowoc, 12 Jul 51, 1♂, J.C. Symmes. *County undetermined:* "Wis," no date, 1♀ (USNM).

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